Five-Year Review Report

Third Five-Year Review Report

for

G&H Landfill Site

Shelby Township

Macomb County, Michigan

September 2011

PREPARED BY:

United States Environmental Protection Agency
Region 5
Chicago, Illinois

Approved by:

Date: 9-13-11

Richard C. Karl
Director, Superfund Division

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Attachments

List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
BGS	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminants of Concern
CRA	Conestoga Rovers & Associates
DWSD	Detroit Water & Sewer Department
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Difference
FYR	Five-Year Review
ISVE/AS	In-situ Vapor Extraction/Air Sparge
MCHB	Macomb County Health Board
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDEQ	Michigan Department of Environmental Quality
MWRC	Michigan Water Resource Commission
NCP	National Contingency Plan
NPL	National Priorities List
OCHD	Oakland County Health Department
O&M	Operation and Maintenance
PAH	Polyaromatic Hydrocarbon
PNA	Polynuclear Aromatics

PCB	Polychlorinated Biphenyl
PEAS	Pollution Emergency Alerting System
PPB	Parts per Billion
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SVE	Soil Vapor Extraction
SVOC	Semivolatile Organic Compound
VOC	Volatile Organic Compound

Executive Summary

The G&H Landfill Site is located in Shelby Township, Macomb County, Michigan, about 20 miles north of Detroit. The Site comprises approximately 60 acres of a former landfill, 30 acres of adjacent wetlands, and other impacted areas including a former junkyard. The Site is bounded on the north by 23 Mile Road and on the east by Ryan Road. Residential areas are located north of 23 Mile Road and east of Ryan Road, and the Clinton River runs through the Rochester-Utica State Recreational Area to the south and west of the Site.

From 1955 to 1973, G&H Industrial Landfill, Inc. accepted industrial waste oil, solvents, and municipal waste for disposal. State authorities noted groundwater contaminated with polychlorinated biphenyls (PCBs) seeping out of the landfill in areas south of the Site, and prohibited further disposal of industrial solvents in the mid-1960s. The State of Michigan referred the Site to the EPA in 1982. EPA performed a Site inspection and proposed the Site for listing on the National Priorities List (NPL) in December 1982. The Site's placement on the NPL was published in the Federal Register on September 8, 1983 (48 Fed. Reg. 40658).

EPA and Michigan Department of Environmental Quality (MDEQ) began a Remedial Investigation and Feasibility Study (RI/FS) in 1984. Based on the findings of the RI/FS, EPA issued a Record of Decision (ROD) on December 21, 1990 that selected a remedy comprising the following actions:

- Installation of a modified RCRA Subtitle C landfill cover to prevent direct contact with contaminated media and reduce the rate of precipitation infiltrating to the water table;
- Excavation of contaminated soils from areas outside of the landfill cover and placement of these impacted soils beneath the landfill cover;
- Installation of a slurry wall around the landfill areas to physically contain the contaminated groundwater and a toe drain on the west side of the landfill to capture leachate for treatment;
- Installation of a groundwater extraction and treatment system to capture and hydraulically contain the landfill contaminants;
- Implementation of a monitoring program to assess the efficacy and progress of the groundwater cleanup;
- Restoration of impacted wetlands and establishment of new wetlands to replace those lost to contamination or remedy implementation;
- Cleanup standards for groundwater outside of the landfill based on Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and State of Michigan criteria for protection of groundwater quality; and
- Institutional Controls in the form of Deed restrictions to restrict development of the landfill and groundwater use in off-site areas.

A protectiveness determination for the remedy at the G&H Landfill Site cannot be made until a

further evaluation of the groundwater/leachate extraction systems can be conducted. It is expected that these evaluations will take approximately twelve months to complete, at which time a protectiveness determination will be made. EPA will issue an addendum to the Five-Year Review (FYR) once the protectiveness determination is complete.

Long-term protectiveness of the remedy will depend on the groundwater extraction and treatment system continuously maintaining an adequate inward hydraulic gradient within the slurry wall and effectively treating extracted groundwater to remove contaminants from the Site, monitoring the groundwater and surface water until the completion of the remedy can be demonstrated by the attainment of cleanup standards, and successful implementation of the Institutional Controls listed in the consent decree.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: G&H Landfill		
EPA ID *(from WasteLAN)*: MID980410823		
Region: 05	**State:** MI	**City/County:** Macomb County
SITE STATUS		
NPL status: ☒ Final ☐ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): ☐ Under Construction ☒ Operating ☐ Complete		
Multiple OUs?* ☐ YES ☒ NO	**Construction completion date:** 08 / 26 / 1999	
Has Site been put into reuse? ☐ YES ☒ NO		
REVIEW STATUS		
Lead agency: ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency		
Author name: William J. Ryan		
Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA, Region 5	
Review period: 4/22/2010 – July 2011		
Date(s) of Site inspection: 5/26/2010		
Type of review: ☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion		
Review number: ☐ 1 (first) ☐ 2 (second) ☒ 3 (third) ☐ Other (specify)		
Triggering action: ☐ Actual RA OnSite Construction at OU #____ ☐ Actual RA Start at OU#____ ☐ Construction Completion ☒ Previous Five-Year Review Report ☐ Other (specify)		
Triggering action date *(from WasteLAN)*: 09/27/2006		
Due date *(five years after triggering action date)*: 09/27/2011		

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary, Continued

Issues:

- Physical and hydraulic containment may not be functioning as designed along the south wall of Phase II, at the southwest corner of Phase II, along the Detroit Water and Sewerage Department water main, and at the toe of Phase III (See Attachment 3 for Site features).
- The discharge and accumulation of orange colored liquids at the Phase III landfill toe may indicate that hydraulic containment to prevent off site migration may not be functioning as designed.
- The current monitoring well locations and list of analytical parameters may not be adequate to determine protectiveness of the remedy.
- Institutional Controls consisting of deed restrictions need review.

Recommendations and Follow-up Actions:

- Physical and hydraulic containment - Develop contingency plans, outlined in the Operation and Maintenance Plan, to achieve physical and hydraulic containment at the south wall of Phase II, the south west corner of Phase II, along the DWSD water main, and at the toe of Phase III.
- The discharge of liquids at the Phase III landfill toe - Develop and execute a sampling and analysis plan to sample the discharge from the Phase III toe and ponded surface waters.
- Adequacy of the monitoring program - Evaluate the monitoring network and analytes to determine if revisions are needed.
- Institutional Controls - Develop and execute an IC study to verify ICs are in place and effective.

Protectiveness Statement:

A protectiveness determination for the remedy at the G&H Landfill Site cannot be made until a further evaluation of the groundwater/leachate extraction systems can be conducted. It is expected that these evaluations will take approximately twelve months to complete, at which time a protectiveness determination will be made. EPA will issue an addendum to the Five-Year Review (FYR) once the protectiveness determination is complete.

Long-term protectiveness of the remedy will depend on the groundwater extraction and treatment system continuously maintaining an adequate inward hydraulic gradient within the slurry wall and effectively treating extracted groundwater to remove contaminants from the Site, monitoring the groundwater and surface water until the completion of the remedy can be demonstrated by

the attainment of cleanup standards, and successful implementation of the Institutional Controls listed in the consent decree.

Other Comments:

None

Five-Year Review Report

I. Introduction

The purpose of this Five-Year Review (FYR) is to determine whether the remedy at the G&H Landfill Site (the Site) is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports. In addition, FYR reports identify issues found during the review, if any, and recommendations to address them.

The Agency is conducting this FYR pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the National Contingency Plan (NCP); 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The United States Environmental Protection Agency (EPA) Region 5 has conducted this FYR of the remedial actions implemented at the G&H Landfill Site in Macomb County, Michigan. This review was conducted from April 22, 2010 (the date of the state notification letter) through July 2011. This report documents the results of the review. EPA was assisted in the review of the G&H Landfill Site by the MDEQ.

This statutory review is the third FYR for the G&H Landfill Site. The triggering action for this review is the date of the second FYR, as shown in EPA's WasteLAN database: 09/27/06. This FYR is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. This document will become part of the G&H Landfill Site file and it will be placed into the Site information repository located at the Shelby Township Library, 51680 Van Dyke Avenue, Shelby Township, MI 48316, Phone: (586) 739-7414.

II. Site Chronology

Table 1 Chronology of Events

Event	Date
Initial discovery of problem or contamination	Early 1960s
Pre-NPL responses	• Michigan Water Resource Commission (MWRC) conducts a groundwater and surface water investigation in July 1965 • The State investigates the Site several more times between 1973 and 1979
NPL listing	September 8, 1983
Removal actions	• July 1982: a fence is constructed around the oil seep area, and dams are built to direct surface water flow around the seeps • July 1983: the fence is extended around the perimeter of the oil seeps, an oil skimmer is installed to prevent the migration of floating oil, and clay barriers are placed in the path of the oil seeps • May 1986: recreational area trails are blocked with earthen berms, a gate is installed to restrict public access, a collector trench is excavated to connect isolated oil seeps, and sheetpile is installed to prevent oil from migrating beyond the collector trench • July 1987: a chain-link fence is installed around the perimeter of the entire Site
Remedial Investigation/Feasibility Study completed	December 21, 1990
ROD signature	December 21, 1990
ESD	ESD, March 13, 1992
Consent Decrees	• CD for Access/Cost Recovery, April 3, 1992 • CD for Cost Recovery, September 2, 1992 • CD for RD/RA, June 30, 1992
Remedial design start	September 10, 1992
Remedial design complete	June 2, 1995
Remedial action start	August 19, 1996
Construction completion date	August 24, 1999
1st Five-Year Review	September 5, 2001
2nd Five-Year Review	September 27, 2006

II. Background

Physical Characteristics: The 90-acre Site is divided into three phases (Attachment 3). An abandoned Conrail railroad right-of-way bisects the Site, running from the southeast corner of the Site to the northwest corner, separating the Phase I landfill area to the north from the Phase II landfill area to the south. The main Site access road, with a gate located on 23-Mile Road, runs north-south on the Site and separates the Phase III landfill area on the west from Phases I and II on the east. A portion of the former Clinton-Kalamazoo Canal, an abandoned navigational project, runs east-west through the southern portion of the Site. Groundwater flow in the shallow aquifer at the Site is primarily toward the south and west, controlled by the channel of the Clinton River.

Current Site topography is defined by three capped mounds (Phases I, II, and III) that characterize the three phases of the former landfilling operation. The Site access road and railroad right-of-way are located at grade, while each of the capped landfill mounds rise approximately 10-15 feet above grade. The formerly used railroad right-of-way was capped between the Phase I and Phase II mounds.

Structures on the Site include a groundwater pumping/treatment facility located in the southwest corner of the Phase II landfill area, which treats effluent from the landfill and discharges treated water into an adjacent wetland area. Operations at the treatment facility are currently managed by the Potentially Responsible Parties (PRP's) technical consultants, Conestoga Rovers & Associates (CRA). CRA was also the engineering firm that implemented the G&H Landfill Site remedy. The Site includes a system of approximately 80 above-ground vents and monitoring wells distributed across the affected area.

A 200-acre preserve located immediately south of the G&H Landfill Site, now known as Holland Ponds, was deeded to Shelby Township by the Michigan Department of Natural Resources in 1993. The area includes seven ponds whose source water includes the treated effluent that leaves the pumping/treatment station at the G&H Landfill Site. Two of the seven ponds in the preserve were constructed by CRA to replace wetlands that had previously existed on the Site. The Holland Ponds area provides habitat for migrating birds and aquatic wildlife. A heron rookery is located adjacent to the Site.

The Detroit Water & Sewer Department (DWSD) easement that runs through the western portion of the Site (between Phases II and III) contains a 96-inch water supply pipeline and a 24-inch interceptor sewer. The water supply line was constructed in 1967 and serves as the main distribution line from Lake Huron to the Detroit Municipal Water System. The 24-inch interceptor sewer, which serves Shelby Township, is connected to a 96-inch regional interceptor sewer that runs beneath portions of the Phase II and Phase III landfill areas.

Land and Resource Use: The 90-acre G&H Landfill Site is located at the junction of 23 Mile Road and Ryan Road (Attachment 1). It is surrounded by a mixture of uses, including Spring Lake and Clear Spring Lake (two residential developments to the north) an older residential subdivision of approximately 80 homes to the east, and several light industrial facilities located to the southeast. The Clinton River runs near the western and southern Site boundaries, and the Holland Ponds Natural Area, part of the former Rochester-Utica State Recreational Area, is located south of the Site (Attachment 2).

A redevelopment study was conducted concurrent with the 2006 FYR to determine whether portions of the Site could be returned to productive use by the surrounding community. EPA engaged a consultant with expertise in specialized reuse planning. The contractor conducted community research, mapping, and analyses to identify reuse challenges and opportunities. The contractor then developed a conceptual Site reuse framework and a project report identifying potential resources and partnerships for planning the Site's future use, and in the spring of 2006 a team met with officials from Shelby Township, EPA Region 5, MDEQ, and PRP representatives to discuss potential options.

With effective planning communities can often return sites to productive use without jeopardizing the effectiveness of the remedy, and local government agencies had indicated strong interest in exploring reuse opportunities for the Site. Nevertheless, EPA's primary responsibility at a site is to ensure the continued protection of human health and the environment, and because the ROD required Institutional Controls, deed restrictions were placed on the Site as part of the consent decree settlement with the estate of the landfill owner, and these deed restrictions preclude any form of use, including recreational use.

History of Contamination: The G&H Site was a sand and gravel quarry until the early 1950s. After quarry operations ceased, the landowner leased the property to the G&H Industrial Fill Company. Waste disposal operations at the Site began in the mid-1950s and continued until 1973. The G&H Industrial Fill Company accepted municipal refuse, solid industrial wastes, and liquid industrial wastes including oils, solvents, paint residues, paints, varnishes, lacquers, and industrial process muds. The Site comprises three distinct landfill areas (Attachment 3):

- Phase I Landfill—44 acres
- Phase II Landfill—17 acres
- Phase III Landfill—8 acres

Separate areas in the Phase I Landfill were identified as receiving solid and liquid wastes, in bulk and in drums. These areas, which are now covered with fill and capped, include:

- Oil Pond No. 1
- Oil Pond No. 2
- Rubbish Area (referred to as the Co-disposal Area)
- Paint, Varnish, and Solvent Ponds

From approximately 1955 to 1967, the G&H Industrial Fill Company operated a waste oil disposal system at the Site. Bulk waste oil from various industrial sources was transported to the Site in railroad tanker cars or tanker trucks. Records indicate that an estimated 600,000 gallons of waste oil was accepted monthly at the Site, although the time period over which this volume was accepted is not known. Initially, the operators attempted to reclaim oil by pumping mixtures to settling ponds and skimming off the recoverable oil for resale. Several attempts were made to reclaim the oil, but none were commercially successful. Thereafter, the oil was reportedly left to settle and the volatile components allowed to evaporate. The resulting sludge was periodically removed from the settling ponds and buried in the landfill.

Initial Response: In the early 1960s, local residents lodged complaints with the Macomb County Health Board (MCHB) regarding chemical odors coming from the Clinton-Kalamazoo canal south of the landfill. An initial inspection by the MCHB did not locate the source of the odors, however joint Site surveillance by the MCHB and the Michigan Water Resource Commission (MWRC) discovered that groundwater seeps south of the railroad tracks emitted a strong chemical odor. MWRC noted that the landfill operation accepted waste oils and municipal trash, along with solvents and paints delivered in 55-gallon drums, and identified three areas in the Phase I landfill where the contents of the drums were dumped. As a result of the initial inspection the MWRC conducted a groundwater and surface water investigation in July 1965.

The 1965 MWRC investigation determined that groundwater in the upper aquifer flowed generally to the south and that liquid waste disposal operations were responsible for contamination in the groundwater south of the railroad tracks. As a result of this investigation, a Consent Order was issued by the Macomb County Circuit Court in May 1966 prohibiting the disposal of paints, varnishes, paint thinners, and lacquers in the G&H landfill. Waste oils were not addressed by this Consent Order.

A second MWRC investigation in November 1966 concluded that the waste oil disposal/reclamation activities at the landfill were also contributing to groundwater contamination. Based upon these findings, the Macomb County Circuit Court issued a second Consent Order in 1967 banning the disposal of any liquid industrial waste at the landfill.

The State investigated the Site several more times between 1973 and 1979. These investigations documented potential contamination of the Clinton River by leachate seeps west of the Phase III landfill area and by oil seeps south of the Phase I landfill area.

Basis for Taking Action: Based on data presented in the 1987 Remedial Investigation Technical Report, EPA assessed the Site's risks and concluded that onsite chemical exposure could occur by direct contact with contaminated media, or by release of volatile compounds and inhalation. Potential exposure routes include the following pathways: (1) direct contact with surface soil on the Phase I Landfill; (2) direct contact with sediments in the oil seep area; (3) direct exposure to the oil seep water; (4) direct exposure to contaminated groundwater; (5) dermal exposure of people engaged in recreational activities in areas adjacent to the Site through direct contact with contaminated surface water and sediments; and (6) consumption of contaminated wildlife. Risks to the environment included exposure of terrestrial wildlife through direct contact with

contaminated media at the Site, and exposure of aquatic organisms in the Clinton River or Clinton-Kalamazoo Canal to contaminants released from the Site by way of groundwater discharge or Site runoff.

The additive excess lifetime cancer risks calculated for ingestion of contaminated groundwater at the Site ranged from 5×10^{-4} to 6×10^{-3}, exceeding the acceptable risk range of 1×10^{-4} to 1×10^{-6}, and thus presenting unacceptable potential risks to human health, and the oil seep area had a calculated additive Hazard Index of 77 (153 for a child), for the ingestion and dermal absorption of contaminants if one were to accidentally fall into the oily waters. Hazard Indices above 1.0 represent an unacceptable exposure to non-carcinogens (See Attachment 3 for location of Site Areas).

Table 2 Summary of Site Risks

Medium/Location	Hazard Index	Risk*
Groundwater		
Area 2	0.74	6×10^{-3}
Area 4	0.63	2×10^{-3}
Area 5	0.74	5×10^{-4}
Surface Soil/Sediments		
Phase I Landfill Area	0.01	4×10^{-6}
Seep Area	0.11	4×10^{-6}
Surface Water		
Seep Area	153	9×10^{-5}

*Excess lifetime cancer risk

Soil Contamination: The areas of the highest soil contamination were in the Phase I Landfill, primarily near the oil ponds and the suspected Co-disposal Area. Soils in or near the Phase II and III Landfill Areas also showed contamination, but to a lesser extent. Soils in the industrial area to the east showed that contamination extended offsite. Many organic compounds were detected, including benzene, toluene, ethylbenzene, and xylene (BTEX) compounds, polynuclear aromatic hydrocarbons (PAHs) and PCBs. Inorganic compounds were also detected above background concentrations in or near the three landfill areas.

Groundwater Contamination: At the time of the remedial investigation the vertical extent of groundwater contamination for BTEX, poly-nuclear aromatics (PNAs), and chlorinated volatile organic compounds (VOCs) appeared to be limited to the base of the refuse and top of the upper sand unit. The horizontal extent of BTEX and chlorinated VOC contamination extended from

the north boundary of the Site southward to the south side of the Clinton Kalamazoo Canal. The highest concentrations of chlorinated VOCs were adjacent to the old solvent pond. Chlorinated VOCs were detected around the sheet pile wall in the Oil Seep Area and near the Oil Storage Building. The chlorinated VOCs extended to the south side of the Clinton Kalamazoo Canal. PNA contamination in the groundwater appeared to follow the same pattern as BTEX contamination, but to a lesser extent and at lower levels. A till layer isolates the upper aquifer from the lower aquifer. No contamination was detected in the lower aquifer.

Well Sampling: BTEX and chlorinated VOCs were detected in residential and commercial well water in the vicinity of the Site. These waste types were consistent with wastes detected onsite. Contamination in the industrial area appeared to be Site related because the waste types were consistent with wastes detected onsite and the contamination was detected upgradient in the auto disposal yard. Given that the types of contaminants found east of Ryan Road were consistent with those found onsite, EPA concluded that the contamination east of Ryan Road was Site related. However, no contamination was detected upgradient of this area.

Surface Water and Sediment Contamination: Separate phase liquids and contaminated groundwater from the original Phase I Landfill area were the sources of the sediment and surface water contamination in the Oil Seep Area and the contamination of surface runoff, which in turn contaminated the groundwater south and southwest of the Oil Seep Area. BTEX and PNA compounds were detected in surface water upgradient of the Oil Seep Area.

IV. Remedial Actions

Remedy Selection: EPA issued a ROD on December 21, 1990 that called for a remedy comprising the following elements:

- Installation of a modified RCRA Subtitle C landfill cover to prevent direct contact and reduce the rate of infiltration to the water table;
- Excavation of contaminated soils from areas outside of the landfill cover and placement of the impacted soils beneath the landfill cover;
- Installation of a slurry wall around the landfill areas to physically contain the contaminated groundwater and a toe drain on the west side of the landfill to capture leachate for treatment;
- Installation of a groundwater extraction and treatment system to capture and hydraulically contain the landfill contaminants;
- Implementation of a monitoring program to ensure the adequacy of the groundwater cleanup;
- Restoration of impacted wetlands and creation of new wetlands to replace those lost to contamination or remedial construction;
- Cleanup standards for groundwater outside of the landfill based on Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and State of Michigan criteria for protection

of groundwater quality; and

- Institutional Controls in the form of Deed restrictions to restrict development of the landfill and groundwater use in off-site areas.

U.S. EPA's groundwater cleanup policy is to attain Maximum Contaminant Levels (MCLs) under the Federal Safe Drinking Water Act (SDWA); however, if cleanup to MCLs causes the residual risk levels to exceed the 1×10^{-4} to 1×10^{-6} risk range, which the U.S. EPA considers to be protective, then the Agency may apply risk-based cleanup levels to reach the goal of protectiveness (a 1×10^{-6} excess lifetime cancer risk). Michigan Act 307, Type B cleanup criteria provide for the calculation of risk-based cleanup standards at the 1×10^{-6} excess lifetime cancer risk level for each carcinogenic compound. These standards are more stringent than the corresponding MCLs or non-zero Maximum Contaminant Level Goals. The U.S. EPA has determined that Michigan Act 307, Type B criteria are protective and may be applicable or relevant and appropriate to the G&H site cleanup.

Final cleanup goals for the Site are as follows:

Table 3 Groundwater Cleanup Standards from 1990 ROD

Contaminant	***Cleanup Standard***
Benzene	1 ppb
Xylene	20 ppb
Ethylbenzene	30 ppb
Arsenic	0.02 ppb*
Lead	5 ppb
Trichloroethene	3 ppb
Tetrachloroethene	0.7 ppb
cis-1,2-Dichloroethene	1 ppb
trans-1,2-Dichloroethene	100 ppb
Vinyl chloride	0.02 ppb
1,1-Dichloroethane	0.4 ppb

** Naturally occurring (background) levels found at the G&H Site may be higher than the Cleanup Standard. In that event, background levels will become the Cleanup Standard.*

EPA issued an Explanation of Significant Differences (ESD) on March 13, 1992. In the ESD, the Agency determined that:

- The Frost Protection Layer of the Landfill Cap could be reduced from the 42 inches to 30 inches;
- Containment could be achieved by a combination of physical and hydraulic methods. As a result, the slurry wall did not need to completely encircle the landfill, and a series of extraction wells and French drains were used to provide hydraulic containment where physical containment had been eliminated; and

- EPA, in consultation with Michigan Department of Natural Resources, also changed the groundwater cleanup standards for three chemical contaminants to their respective analytical detection limits. The revised groundwater cleanup standards are shown in the table below.

Table 4 Groundwater Cleanup Standards Modified by the ESD

Contaminant	*1990 ROD Cleanup Standard*	*1992 ESD Cleanup Standard*
Tetrachloroethene	0.7 ppb	1.0 ppb
Vinyl chloride	0.02 ppb	1.0 ppb
1, 1-Dichloroethane	0.4 ppb	1.0 ppb

Remedy Implementation: In a Consent Decree (CD) signed with EPA on June 30, 1992, the Potentially Responsible Parties agreed to perform the remedial design/remedial action (RD/RA). The remedial design (RD) was conducted in compliance with the 1990 ROD as modified by the 1992 ESD. The RD started on September 10, 1992, and was completed on June 2, 1995. The remedial action (RA) started on August 19, 1996, and was completed on August 24, 1999.

The RD had two parts: (1) the groundwater and leachate treatment system; and (2) the landfill cap and slurry wall. EPA, in consultation with MDEQ, approved one major design change involving the substitution of a combination of 1 foot of clay and a bentonite-containing geotextile liner for the required 3 feet of clay in a Subtitle C landfill cap, after the PRPs were able to demonstrate that the clay/geotextile liner performed as well as the thicker clay layer.

The major components of the RA included the following:

- Installation of a modified RCRA Subtitle C landfill cover to prevent direct contact and reduce the rate of infiltration to the water table;

- Excavation of impacted soils from areas outside of the landfill cover and placement of the impacted soils beneath the landfill cover;

- Installation of a slurry wall around the landfill areas to physically contain the landfill contents and a toe drain on the west side of the landfill to capture leachate for treatment (This was subsequently modified by an ESD in 1992);

- Installation of a groundwater extraction and treatment system to capture and hydraulically contain the landfill contaminants;

- Implementation of a monitoring program to ensure the adequacy of the groundwater cleanup; and

- Mitigation of impacted wetlands and creation of new wetlands to replace those lost to contamination or the cleanup

Institutional Controls: The Consent Decree requires the PRPs to record a fully executed copy of the Consent Decree and the Deed Restrictions (Attachment 8) with the Register of Deeds Office, Macomb County, State of Michigan, to ensure future use of the Site will not impair or defeat any response actions on, under, or adjacent to the Site.

The Consent Decree requires that the following restrictions be imposed upon the Site for the purposes of protecting public health and the environment, and preventing interference with the remedy:

- No consumptive or other use of the groundwater that could cause exposure of humans or animals to the groundwater underlying the Site.
- No residential, commercial, or agricultural use of the Forster property considered part of the Site, including, but not limited to, any filling, grading, excavating, building, drilling, mining, farming, or other development, or placing of waste material at any portion of the Site, including, but not limited to, the Auto Disposal Yard as described above, for any purpose, including residential, commercial, or agricultural purposes, except as approved in writing, by EPA.
- No use of the Site that would allow the continued presence of humans at the Site, other than the presence necessary for implementation of any response actions selected and/or undertaken by EPA pursuant to Section 104 of CERCLA, including such response actions taken by other responsible parties under a judicial or administrative order. A prohibited use of the Site includes, but is not limited to, recreational use.
- No installation, removal, construction or use of any buildings, wells, pipes, roads, ditches or any other structures or materials at the Site except as approved, in writing, by EPA, and in consultation with the State of Michigan.
- No tampering with, or-removal of, the containment or monitoring systems that remain on the Site as a result of implementation of any response action by EPA, or any party acting as agent for EPA, and which is selected and/or undertaken by EPA pursuant to Section 104 of CERCLA.
- No use of, or activity at, the Site that may interfere with, damage, or otherwise impair the effectiveness of any response action (or any component thereof) selected and/or undertaken by EPA, or any party acting as agent for EPA, pursuant to Section 104 of CERCLA, except with the written approval of EPA, in consultation with the State of Michigan, and consistent with all statutory and regulatory requirements.

The obligation to implement and maintain the above restrictions shall run with the land and shall remain in effect until such time as EPA files with the Court a written certification stating:

- The response action required at, under or adjacent to the Site by any Consent Decree or judicial or administrative order, entered pursuant to CERCLA, has been fully implemented.
- No other response actions are planned for the Site.
- The above restrictions are no longer necessary to meet the purposes of the remedy.

System Operation and Maintenance: The PRPs are conducting long-term monitoring and maintenance activities according to the EPA approved operation and maintenance (O&M) plan. The primary activities associated with O&M include:

- Bi-weekly and monthly inspections are conducted in the landfill cap, groundwater/leachate collection systems, slurry wall, wetlands areas, access roads, and perimeter security fence. In addition, the cap is scheduled to be mowed semi-annually.

- Groundwater samples and water level measurements are obtained quarterly from 71 monitoring wells.

Table 5 Annual System Operations/O&M Costs

Dates		Total Cost rounded to nearest $1,000
From	*To*	
9/2009	9/2010	$509,000
9/2008	9/2009	$538,000
9/2007	9/2008	$552,000
9/2006	9/2007	$541,000
9/2005	9/2006	$451,000
9/2004	9/2005	$492,000
9/2003	9/2004	$506,000
9/2002	9/2003	$588,000
9/2001	9/2002	$716,000

V. Progress Since the Last Review (September 2006)

Protectiveness statements from the last review: The remedy is currently protective of human health and the environment in the short term. The landfill cover, groundwater extraction and treatment system, and access controls are functioning as designed, and have achieved the remedial objectives, which include minimizing the migration of contaminants to groundwater and surface water and preventing direct contact with contaminants at the Site.

Long-term protectiveness of the remedy is dependent upon the continued effectiveness of the groundwater extraction and treatment system in maintaining an inward hydraulic gradient and removing contaminants from the Site. Monitoring of the groundwater and surface water will continue until the performance of the remedy can be demonstrated by the attainment of groundwater cleanup standards. An Institutional Controls study will be completed within six months after the date of this FYR Report.

Issues and status of recommendations for follow-up actions from last review:

- **Issue:** There is evidence that the hydraulic containment along the south wall of Phase II may be compromised.

- **Recommendation:** Investigate the apparent hydraulic connection between GH-78 and GH79 and ensure the maintenance of an inward hydraulic gradient.

- **Status:** The PRPs have monitored the hydraulic gradients between GH-78 and GH-79 as a part of routine operation and maintenance with some additional evaluation of the hydraulic interconnectivity since the 2006 FYR. With the exception of a few isolated events, a one foot or greater hydraulic gradient has been maintained between GH-78 and GH-79 since start-up of the system, however this location does not meet the performance requirement of a two feet inward gradient that was specified in the Consent Decree. Chemical concentrations for benzene have declined in GH-79 from 170 ppb in 2000 to non-detect (less than 1.0 ppb) in 2010. Concentrations for arsenic have remained stable ranging from 45.4 ppb in 2000 to 37.5 ppb in 2010. Monitoring wells in this area were constructed with 15 feet screened intervals and chemical concentration data may be biased by the long screen length. The analytical data reviewed for this location include only the Site specific list of VOCs and metals with the exception of a larger comprehensive data set every 5 years.

- **Issue:** Hydraulic containment in the SW corner of Phase II is affected by a discontinuity in the slurry wall due to the presence of the DWSD easement containing a 96" sanitary sewer.

- **Recommendation:** Evaluate the effects of the discontinuity in the slurry wall in the southwest corner. Plan to extend the slurry wall once the water main is abandoned and/or evaluate the potential of additional extraction wells to contain the landfill contents.

- **Status:** Chemical concentrations for the contaminants monitored remain generally stable or declining at most monitoring wells near the SW corner of Phase II. Exceptions to this trend include monitoring well GH-51 with arsenic concentrations increasing from 80.1 ppb in 2000 to 125 ppb in 2010, and GH-50 with benzene concentrations increasing from 2.0 ppb in 2000 to 6.0 ppb in 2010 and arsenic concentrations increasing from 25 ppb in 2000 to 117 in 2010. Both benzene and arsenic exceed the groundwater cleanup standards of 1.0 ppb and 0.02 ppb, respectively. Nevertheless, there is no confirmation that the absence of the slurry wall in this area causes an uncontrolled release of contaminants around the west end of the slurry wall.

- **Issue:** Groundwater mounding at GW-7 remains unexplained. A 7 ft hydraulic head difference was recorded between the water level in GW7 and the surrounding source area.

- **Recommendation:** Determine the cause of the mounding at GW-7.

- **Status:** When monitoring wells, gas probes, wet wells, gas vents, and sumps were re-surveyed in December 2006, the re-surveyed reference data were compared to previous surveys to determine if there were any discrepancies that could explain the mounding in GW-7. The new survey revealed that two wells were erroneously labeled GW-7. The true GW-7 is situated upgradient of the containment system near GH-52, and the groundwater mound at GW-7 appears to have been an artifact of using the water level measurement for the incorrectly labeled GW-7. Current water levels from the true GW-7 do not indicate a mound at GW-7. The well that was incorrectly labeled GW-7 has been renamed GH-95 to avoid further confusion. A formal submittal of explanation has not yet been submitted to document the resolution of this issue.

- **Issue:** Effectiveness of the leachate collection system at the toe of Phase III has been questioned, and there have been problems in maintaining adequate flow to the treatment plant.

- **Recommendation:** Develop a plan to evaluate the effectiveness of the leachate collection system at the toe of Phase III.

- **Status:** The PRPs evaluate the operation and effectiveness of the Phase III toe drain during routine O&M activities. The Phase III toe drain has operated since start-up of the remedy with the exception of limited periods of down time for periodic repairs. The drain operates at a flow rate of approximately 10 gallons per minute, and orange colored liquids have been observed discharging from the cap drainage layer surface drains since construction completion in 1999. The discharges appear to be stained with iron and bacteria and have been observed with surface sheens and odors. Adjustments of the sump elevations and the low-level switches within the sumps for the Phase III toe drain were completed in late 2009 and early 2010 to increase the performance of the toe drain. Nevertheless, the PRPs have indicated they recognize the need for additional dewatering. MDEQ has assembled groundwater/leachate elevation data from monitoring wells MW-48 and MW-49 (Attachment 4, Chart 18) which shows that as of June 2010 the elevation of groundwater at MW-48 and MW-49 is more than 4 feet above the 6 inch diameter toe drain collection pipe invert elevation.

- **Issue:** MDEQ has questioned the adequacy of the groundwater monitoring network and list of analytical parameters for ensuring the continued protectiveness of the Site.

- **Recommendation:** Reevaluate the list of analytical parameters and develop a system for regular electronic data submission.

- **Status:** The PRPs evaluate the monitoring well network and list of analytical parameters as a part of routine O&M. Since the start up of the remedy, various wells have been added to the monitoring program and wells determined to have poor integrity or that are damaged have been replaced. A comprehensive round of sampling is conducted every five years to assess the need for additional parameters. Based on this monitoring, the PRPs contend that additional parameters are not required. Nevertheless, 11 compounds exceed the lifetime cancer risk of 10^{-6} and 12 compounds exceeded the non-cancer hazard quotient of 1.0. Of these compounds, 3 (benzene, vinyl chloride, and arsenic) currently have assigned cleanup standards. Also, both arsenic and aroclor-1254 exceed the lifetime cancer risk of 10^{-6} and the non-cancer hazard quotient of 1.0.

  Fifteen compounds exceed their established MCL value and/or Michigan's former Act 307, Type B Criteria (basis for most of the groundwater cleanup standards); and an additional 5 compounds, not already identified in the 15 compounds exceeding criteria, exceed a lifetime cancer risk of 10^{-6} or a hazard index value of 1.0. These compounds include:

1,2-dichloroethane	Aluminum
1,4-dichlorobenzene	Antimony
Bis(2-chloroethyl)ether	Iron
Bis(2-ethylhexyl)phthalate	Manganese
Aroclor-1254	Nickel
Alpha-BHC	Sodium
Beta-BHC	Thallium
Delta-BHC	Zinc
4-methylphenol	Cyanide
Phenol	Sulfate

- **Issue:** Institutional Controls consisting of deed restrictions are outlined in the CD, however their implementation is uncertain and needs review.

- **Recommendation:** Complete an IC study for the Site within twelve months after the date of this FYR report.

- **Status:** Subsequent to the 2006 Five-Year Review, PRP representatives had discussions with EPA regarding ICs. Based on these discussions, it appeared the PRPs were in compliance with their obligations regarding ICs under their Consent Decree, and that the ICs put in place by the PRPs, as well as other deed restrictions established independently under a separate Consent Decree between U.S. EPA and the Estate of Leonard Forster, appeared sufficient for the remedy and all ongoing activities at the Site. Nevertheless, EPA is requesting that the PRPs conduct a formal IC study to ensure the adequacy of the

following provisions: (1) whether the deed restrictions for the Site were actually put in place by a person with authority to make the conveyance; (2) whether the deed restrictions are currently valid and have not been lifted or superseded; (3) whether the terms of the deed restrictions create rights that can be enforced by EPA or MDEQ in the event that the deed restrictions are violated; and (4) whether the deed restrictions are being complied with.

- **Issue:** Long-term stewardship of the Site must be ensured.
- **Recommendation:** Develop an IC Action Plan that will include the following provisions: (1) completing an IC study to evaluate whether effective ICs have been implemented; (2) implementing corrective measures; (3) developing IC maps and ensuring that effective procedures are in place for long-term stewardship. These procedures should include regular inspections of ICs at the Site and certifications to EPA that ICs are in-place and effective, along with exploring the development of a communications plan and the use of the state's one-call system.
- **Status:** An IC Action Plan has yet to be developed.

- **Issue:** Changes in the monitoring well network call into question the adequacy of the current Site survey.
- **Recommendation:** EPA recommends that the PRPs re-survey the Site.
- **Status:** Various Site features including all monitoring wells, gas probes, wet wells, gas vents, and sumps were re-surveyed during December 2006. A formal submittal to demonstrate the resolution of this issue has not been received.

- **Issue:** The Site currently lacks protocols for ensuring monitoring and extraction well integrity.
- **Recommendation:** EPA recommends that the PRPs amend the O&M Plan to include a quality assurance process for determining when a well needs rehabilitation and/or replacement.
- **Status:** Discussions with the PRPs regarding the development of protocols for ensuring monitoring and extraction well integrity are ongoing.

VI. Five-Year Review Process

Administrative Components: For the current report the Remedial Project Manager (RPM) established a review schedule, which included:

- Community Notification
- Document Review
- Data Review
- Site Inspections
- Five-Year Review Report Development and Review

A letter notifying the State that EPA would be conducting a FYR (Five-Year Review) in 2011 was sent to the State Project Manager on April 22, 2010. Members of the review team included:

- Bill Ryan, EPA, Remedial Project Manager
- Kristi Zakrzewski, MDEQ, State Project Manager
- Barb Vetort-Tiffany, MDEQ, State Project Geologist

Community Notification: Activities to involve the community in the five-year review process were initiated in January 2011 with a call to the Community Involvement Coordinator (CIC) for the G&H Site. A notice was published in a weekly Macomb County newspaper, *The Source*, on April 14, 2011. No one in the community has voiced any interest or opinion concerning the five-year review process since the notice was issued.

Document Review: This five-year review included a review of the following documents:

- Enforcement documents (Consent Decrees and Administrative Orders)
- Design documents (RI/FS Reports)
- Decision documents (ROD)
- O&M records and monitoring data

Data Review: In their capacity as a cooperating agency, MDEQ conducted reviews of the chemical and water level data for Phases I and II, the Phase III leachate collection system, and the down gradient plume to determine if the containment and leachate collection systems are operating as designed. EPA is also conducting an independent analysis of the issues identified in this Five-Year Review of the Site, and will use this analysis to guide the implementation of recommendations.

The March 30, 2000 Operation and Maintenance Plan for the Containment System, Site Cap, and

Wetlands Mitigation (OMP) prepared by Conestoga-Roveers & Associates on behalf of the PRP group outlines the purpose and design intent of each component of the containment system, Site cap, and wetlands mitigation. The OMP (Section 4.2.2) states that "The groundwater/leachate collection systems are designed to hydraulically isolate the Phase I, II, and III landfill areas and the former oil seep area." The MDEQ review analyzed each functional area of containment system and down gradient plume. The results are presented in Attachment 4 and discussed below.

Containment System

Barrier Wall Performance Monitoring

The performance requirements for the barrier wall and associated collection system are outlined in the Scope of Work (SOW), Appendix 4 of the Consent Decree for United States of America v. Browning-Ferris Industries, Inc., et al., dated June 30, 1993 (Section II.B). It requires the remedy to "provide an inward 2.0 ft hydraulic gradient across the trench (i.e., the hydraulic head of the water table outside of the downgradient barrier shall be a minimum 2.0 feet higher than the hydraulic head of the water table on the inside of the downgradient barrier)." This performance requirement was met at 4 of 8 and 2 of 8 monitoring locations in March 2010 and June 2010, respectively. Additionally, 1 location during the March monitoring event demonstrated an outward gradient (GH 52/53) and one location during the June event demonstrated an inward gradient of only 0.06 ft (GH-52/53).

The inward gradient achieved across the slurry wall during the past 10 years of operation was evaluated by the MDEQ by comparing the inward gradient achieved (expressed in feet) over time at the internal/external monitoring well pairs along the slurry wall. Results of that evaluation are found in Attachment 4, Charts 1 - 8. The charts illustrate the following facts regarding the 2.0 feet inward gradient:

- Was achieved and maintained at the GH 56/57 pair
- Was initially achieved and maintained, but has been lost in recent years at pairs GH 60/61 and GH 82/83
- Was initially achieved and maintained, lost for a period of years, and then recently regained at pair GH 80/81
- Has rarely been achieved at pairs GH 52/53, GH 54/55, GH 58/59, and GH 78/79

Charts 1 through 8 also show that an outward gradient occurred frequently at pair GH 52/53, occurred at pair GH-54/55 for most of 2008 and 2009, and occurred at pair GH 58/59 for most of 2007.

Water level trend charts prepared by the MDEQ for monitoring wells GH 52, GH 54, GH 56, GH 58, GH 60, GH 78, GH 80, and GH 82 (Attachment 4, Charts 9 - 16) show water levels over time

compared to the collection pipe invert elevations of the barrier wall collection system. The barrier wall collection system consists of a 6-inch high density polyethylene (HDPE) leachate collection pipe and a 4 inch HDPE pipe, constructed approximately 10 feet above the 6 inch leachate collection pipe, to collect non aqueous phase liquids (NAPL). The following observations are illustrated by the water level trend charts:

- Water levels have fluctuated approximately 2-3 feet seasonally within the capped cells with a general increasing trends observed at GH 52, GH 54, GH 60, GH-80, and GH-82 throughout the past 10 years of operation.
- Water levels have exceeded the collection pipe inverts of the collection system throughout the past 10 years of operation.
- June 21, 2010, water levels at monitoring wells inside of the slurry wall ranged from 10.75 feet at GH 52 to 14.41 feet at GH 58 above the invert of the 6 inch HDPE leachate collection pipe.
- June 21, 2010, water levels ranged from 1.77 feet at GH 78 to 5.26 feet at GH 60 above the invert of the 4 inch HDPE NAPL collection pipe.

The OMP (Section 5.1.4) states that "Successful hydraulic containment would be manifested in decreasing (and eventually "clean") groundwater samples from the monitoring wells immediately downgradient of the barrier wall (i.e., GH-53, GH-55, GH-57, GH-59, GH-79, and GH-81)." Ten years of monitoring data indicate that concentrations of most of the Site specific chemicals monitored have remained stable or are decreasing with the exception of arsenic concentrations increasing at GH-59. Most of the well locations referenced above have shown a decreasing trend for benzene and a fluctuating or stable concentration trend for arsenic.
In summary, hydraulic and chemical data reviewed do not consistently represent successful performance of the barrier wall and collection system at many monitoring locations. Additionally, the water levels observed were several feet above the NAPL collection piping, compromising the ability of the collection system to retrieve NAPL. The containment system's inconsistent adherence to performance objectives indicates portions of the barrier wall are not functioning as designed.

Groundwater Monitoring at the West End of the Barrier Wall

Because the slurry wall is discontinuous at the intersection with the DWSD 96-inch water main, four new monitoring wells were installed directly west and southwest of the terminus for the verification of hydraulic containment. The OMP (Section 5.1.4) states that "Hydraulic containment will be verified by ensuring that the hydraulic gradient between monitoring well pairs GH-67 and GH-68 favors flow toward the east and that the hydraulic gradient between monitoring well pairs GH-51/GH-50, GH-67/GH-66, and GH-68/GH-66 favor flow toward the north."

During the March and June 2010 monitoring events, flow at GH 67/68 appears to be to the west, flow at GH 51/50 appears to be to the north, flow at GH 67/66 and GH 68/66 appears to be to the

south. Comparing the performance evaluation standards of the OMP to the March and June 2010 monitoring data, this section of the containment remedy is not consistent with performance objectives outlined in the OMP.

The OMP (Section 5.1.4) also states "In order to provide additional assurance that hydraulic capture of leachate-impacted groundwater is maintained, groundwater quality monitoring will be conducted at monitoring wells at GH 05A, GH 50, GH 51, GH 66, GH 67, GH 68, and GH 69. If COC concentrations are increasing over time at any of these monitors, contingency actions will be implemented..." Although typically contaminant trends are decreasing, the persistence of benzene and cis 1,2 dichloroethene in the sampled monitoring wells, and fluctuating arsenic trends at some of the wells, may indicate a persistent source of contamination in the groundwater at the west end of the barrier wall.

Detroit Water and Sewerage Department (DWSD) Water main

The SOW requires that, "The well(s) shall be operated and maintained to continuously prevent the groundwater table or landfill contaminants from contacting the water main." Additionally the OMP (Section 4.2.2) indicates that "The pipe and media drain adjacent to the DWSD 96-inch water main is designed to prevent the contact of groundwater with the water main. Therefore, this system will also be operated to maintain this drain in a dewatered condition." MDEQ evaluated the elevation of leachate in monitoring wells adjacent to the DWSD water main against the average invert elevations of the water main. As shown on Chart 17 (Attachment 4), the collection system has not met this requirement. One exception was noted for the October 2002 to February 2003 period, where a leachate elevation was recorded below the invert elevation of the water main at 1 of 5 monitoring locations (GH 75). June 21, 2010 water levels ranged from approximately 8 feet at GH-73 to 14 feet at GH-77 above the invert elevation of the DWSD 96-inch water main indicating that the water main is completely submerged by groundwater/leachate. This analysis indicates that contingency actions outlined in the OMP may be required.

Phase III Leachate Collection System Performance Monitoring

The OMP (Section 4.2.2) indicates "The pipe and media drain located along the toe of the west side of Phase III is designed to provide dewatering of the Phase III slope for structural stability and to intercept the groundwater/leachate in this area to prevent off-site migration. As a result, this component will be operated to maintain this drain in a dewatered condition." MDEQ evaluated the water levels measured at GH 48, GH 49, and GW 10 over time with the toe drain collection pipe invert elevation of the 6 inch HDPE collection pipe. The following is shown on Charts 18 and 19 (Attachment 4):

- Water levels have significantly exceeded the toe drain collection pipe invert of the collection system throughout the past 10 years of operation; and
- June 21, 2010, water levels ranged from 4.5 feet at GW 10 to 4.83 feet at GH 49 above the toe drain collection pipe invert.

As indicated from Charts 18 and 19, the Phase III collection system has not achieved a dewatered condition and likely may not be providing hydraulic containment of the leachate and contaminated groundwater in Phase III.

In summary, regarding the containment system for Phases I, II, III, and the DWSD water main, the SOW (IIB, B) states, "Settling Defendants shall design, construct, and operate and maintain a source containment system which shall hydraulically and physically isolate the Phase I, II, and III landfill areas." It also states the following: "Should groundwater level measurements show that the source containment system is not maintaining hydraulic and/or physical containment of the Site, EPA [Environmental Protection Agency], in consultation with the MDNR [Michigan Department of Natural Resources], shall request Settling Defendants to provide a plan for corrective action." and "Upon approval of the corrective action plan, Settling Defendants shall implement the plan in accordance with the schedule set forth in the approved plan." (IIB, B7, Correction of Deficiencies). As illustrated by the analysis provided above, a request for a corrective action plan is indicated and contingency plans need to be implemented.

Down Gradient Plume

Seepage Face Receptor Monitoring

Point of compliance (POC) wells, identified in the OMP to monitor the seepage face receptor, are GH 04A/B, GH 05A, GH 07A, GH 08B, GH 09A/B, and GH 50A/B. All monitoring locations, except GH 08A, exceed the cleanup standard for arsenic (0.02 micrograms per liter [ug/L]). Nevertheless, the ROD states that naturally occurring (background) arsenic levels found at the G&H site may be higher than the Cleanup Standard. In that event, background levels will become the Cleanup Standard. Background levels for arsenic remain undetermined.

Sentry wells located upgradient of the seepage face POC wells include GH 03A/B, GH 06A/B, GH 34A/B, GH 43A/B, and GH 44A. All sentry wells exceed the SOW cleanup standard for arsenic, except GH 43A, and monitoring well GH 43B also exceeds the SOW cleanup standards for cis 1,2 dichloroethene (1.0 ug/L) and vinyl chloride (1.0 ug/L). Sentry wells are located a minimum of 3½ years groundwater travel time upgradient of the seepage face POC wells and are positioned to provide ample time to implement contingency measures in the event that contaminant levels indicate action is necessary.

Downgradient Wetlands Receptor Monitoring

The POC wells monitored for downgradient wetlands receptors included GH 01A, GH 02A, GH 03A, and GH 34A. These POC wells all exceed the cleanup standard for arsenic (see above). MDEQ has also completed a review of the expanded chemical parameter data set that was completed for this Five-Year Review in accordance with the SOW. The SOW (IIG, 5) states that compounds found to be above the MCLs, non zero maximum contaminant level goals (MCLGs), or cleanup standards derived under Michigan's former Act 307, Type B Criteria shall be added to the list of groundwater cleanup standards for the Site with the cleanup standard being the more

stringent of the MCLs or the Michigan's former Act 307, Type B Criteria. Additionally, the SOW states that compounds exceeding a lifetime cancer risk of 10^{-6} or a hazard index value of 1.0 shall be added to the list of groundwater cleanup standards for the Site with the cleanup standard established at the level representing a 10^{-6} cancer risk or a 1.0 hazard index value, provided that the cleanup standard established exceeds the natural background concentration of the contaminant.
Eleven compounds exceed the lifetime cancer risk of 10^{-6} and 12 compounds exceeded the non cancer hazard quotient of 1.0. Of these compounds, three (benzene, vinyl chloride, and arsenic) currently have assigned cleanup standards. Also noted was that arsenic and aroclor-1254 exceed both the lifetime cancer risk of 10^{-6} and the non cancer hazard quotient of 1.0. The remaining compounds are discussed below.

Fifteen compounds exceed their established MCL value and/or Michigan's former Act 307, Type B Criteria, and an additional five compounds, not already identified in the fifteen compounds exceeding criteria, exceed a lifetime cancer risk of 10^{-6} or a hazard index value of 1.0. These compounds include the following:

Table 6 Compounds exceeding the MCL and/or former Act 307, Type B Criteria

1,2-dichloroethane	Aluminum
1,4-dichlorobenzene	Antimony
Bis(2-chloroethyl)ether	Iron
Bis(2-ethylhexyl)phthalate	Manganese
Aroclor-1254	Nickel
Alpha-BHC	Sodium
Beta-BHC	Thallium
Delta-BHC	Zinc
4-methylphenol	Cyanide
Phenol	Sulfate

Groundwater detections from the June 23, 2008 sampling event, federal and state cleanup criteria, and summary of compounds exceeding a lifetime cancer risk of 10^{-6} or a hazard index value of 1.0 are presented in the attached Table 1 (Attachment 4). A comprehensive review of compounds that should be added to the Site monitoring program is indicated by this review.

Site Inspections: EPA inspected the Site on May 26, 2010, accompanied by the Project Manager and Geologist from MDEQ and representatives for the PRPs. The group reviewed the Site history and examined the landfill cap, adjacent wetlands, and the groundwater extraction and treatment system. Specific observations include the following:

- Fence - the main part of the fence, which isolates the landfill and treatment plant from public access, is intact and well maintained. Nevertheless, portions of the fence along the Phase III landfill have been damaged by fallen trees, and some sections of the fence have been cut to allow access to the Phase I and II landfills by adjacent property owners. The PRPs indicated they would initiate repairs following the Site inspection.

- Roads - the access roads into the Site, around the perimeter of the capped area, to the treatment plant, and through the wetlands area were properly graded and well maintained.
- Landfill Cap - the cap appears intact and well maintained, no signs of settlement, cracks, erosion, holes, penetrating vegetation, bulges, or slope instability were observed. Nevertheless, minor areas of surface water ponding were observed throughout the Phase I and II landfills, and stained soils and orange colored liquids indicating a possible leachate discharge were observed at the toe of the Phase III landfill.
- Wetlands - the wetlands associated with the treatment plant and Holland Ponds area appear to be in satisfactory condition. Invasive species (phragmites) were observed in portions of the mitigated wetlands and the Holland Ponds Recreational Area.
- Treatment Plant - the treatment plant discharge reports were reviewed with the plant operator and no substantive deficiencies were noted.

Interviews: Interviews with individuals beyond the five-year review project team and treatment plant operator were not conducted. Since the newspaper notice, no member of the community or any other individual voiced any interest in conducting an interview related to the five-year review.

VII Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

NO - The Consent Decree stipulates that the settling defendants must design, construct, operate, and maintain a source containment system that hydraulically and physically isolates the Phase I, II, and III landfill areas and prevents the further migration of hazardous substances from the Site.

After a review of the available data it appears that portions of the remedy may not be functioning as designed, as the physical and hydraulic containment systems for Phases I, II, and III have not consistently achieved the performance requirements outlined in the SOW and OMP. Specifically, the groundwater extraction and treatment system has not been consistent in maintaining a 2 foot inward hydraulic gradient across the slurry wall and continuously preventing the water table or landfill contaminants from contacting the DWSD water main. Orange colored liquids have also been accumulating along the toe of the Phase III landfill, and past evaluations of these liquids indicate that chemicals of concern were present in the ponded liquids. The State has also raised questions regarding whether the monitoring well network and current list of analytical parameters provide adequate data to assess the overall effectiveness of the remedy.

The Institutional Controls required by the consent decree include prohibitions on the groundwater use, prohibitions on excavation or disturbance of the cap, and any other activities that might interfere with the remedy. Nevertheless, it remains necessary to verify that the Institutional Controls are in place and effective. The settling defendants have been issued a letter outlining the steps necessary to ensure the effectiveness to the Institutional Controls.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

YES - The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures (older child trespasser, adult trespasser) and potential future exposures (young and older future child resident, future adult resident and future adult worker). There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions or the cleanup levels developed from them is warranted. There have been no changes to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

MDEQ has raised the issue that the selected remedy may not conform to the standards of Michigan's generic Groundwater Surface Water Interface (GSI) criteria. EPA will continue to discuss this issue with the State.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

YES - There is concern that the slurry wall may be compromised along the southern edge of Phase II, and containment at the southwest end of the slurry wall near the DWSD water main is uncertain. These issues need further evaluation. Plans to extend the slurry wall once DWSD abandons the water main, or take other measures to ensure hydraulic containment of the landfill contents, should be developed.

Technical Assessment Summary

According to the data review and the Site inspection, portions of the remedy may not be functioning as intended by the ROD, as modified by the ESD. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. Nevertheless, hydraulic containment of leachate within the boundary of the capped areas needs further evaluation to determine if additional engineering controls will be necessary.

VIII. Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Physical and hydraulic containment may not be functioning as designed along the south wall of Phase II, at the southwest corner of Phase II, along the DWSD water main, and at the toe of Phase III.	TBD	Y
The discharge and accumulation of orange colored liquids at the Phase III landfill toe may indicate that hydraulic containment to prevent off Site migration is not functioning as designed.	TBD	Y
The current monitoring well locations and list of analytical parameters may not be adequate to determine protectiveness of the remedy.	N	Y
Institutional Controls consisting of deed restrictions need review.	N	Y

IX. Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Physical and hydraulic containment along the south wall of Phase II, at the southwest corner of Phase II, along the DWSD water main, and at the Phase III toe.	Develop contingency plans, outlined in the OMP, to achieve physical and hydraulic containment at the south wall of Phase II, at the south west corner of Phase II, along the DWSD water main, and at the toe of Phase III.	PRPs	EPA/MDEQ	09/30/12	TBD	Y

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
The discharge and accumulation of orange colored liquids at the Phase III landfill toe	Develop and execute a sampling and analysis plan to sample the discharge from the Phase III toe and ponded surface waters.	PRPs	EPA/MDEQ	09/30/12	TBD	Y
The current monitoring well locations and list of analytical parameters	Evaluate the monitoring network and the 20 compounds identified in the June 23, 2008 sampling event to determine if revisions are needed.	PRPs	EPA/MDEQ	09/30/12	N	Y
Institutional Controls consisting of deed restrictions	Develop and execute an IC Study to determine whether ICs are in place and effective	PRPs	EPA/MDEQ	09/30/12	N	Y

X. Protectiveness Statement

Short-term Protectiveness: A protectiveness determination for the remedy at the G&H Landfill Site cannot be made until a further evaluation of the groundwater/leachate extraction systems can be conducted. It is expected that these evaluations will take approximately twelve months to complete, at which time a protectiveness determination will be made. EPA will issue an addendum to the Five-Year Review (FYR) once the protectiveness determination is complete.

Long-term Protectiveness: Long-term protectiveness of the remedy will depend on the groundwater extraction and treatment system continuously maintaining an adequate inward hydraulic gradient within the slurry wall and effectively treating extracted groundwater to remove contaminants from the Site, monitoring the groundwater and surface water until the completion of the remedy can be demonstrated by the attainment of cleanup standards, and successful implementation of the Institutional Controls listed in the Consent Decree.

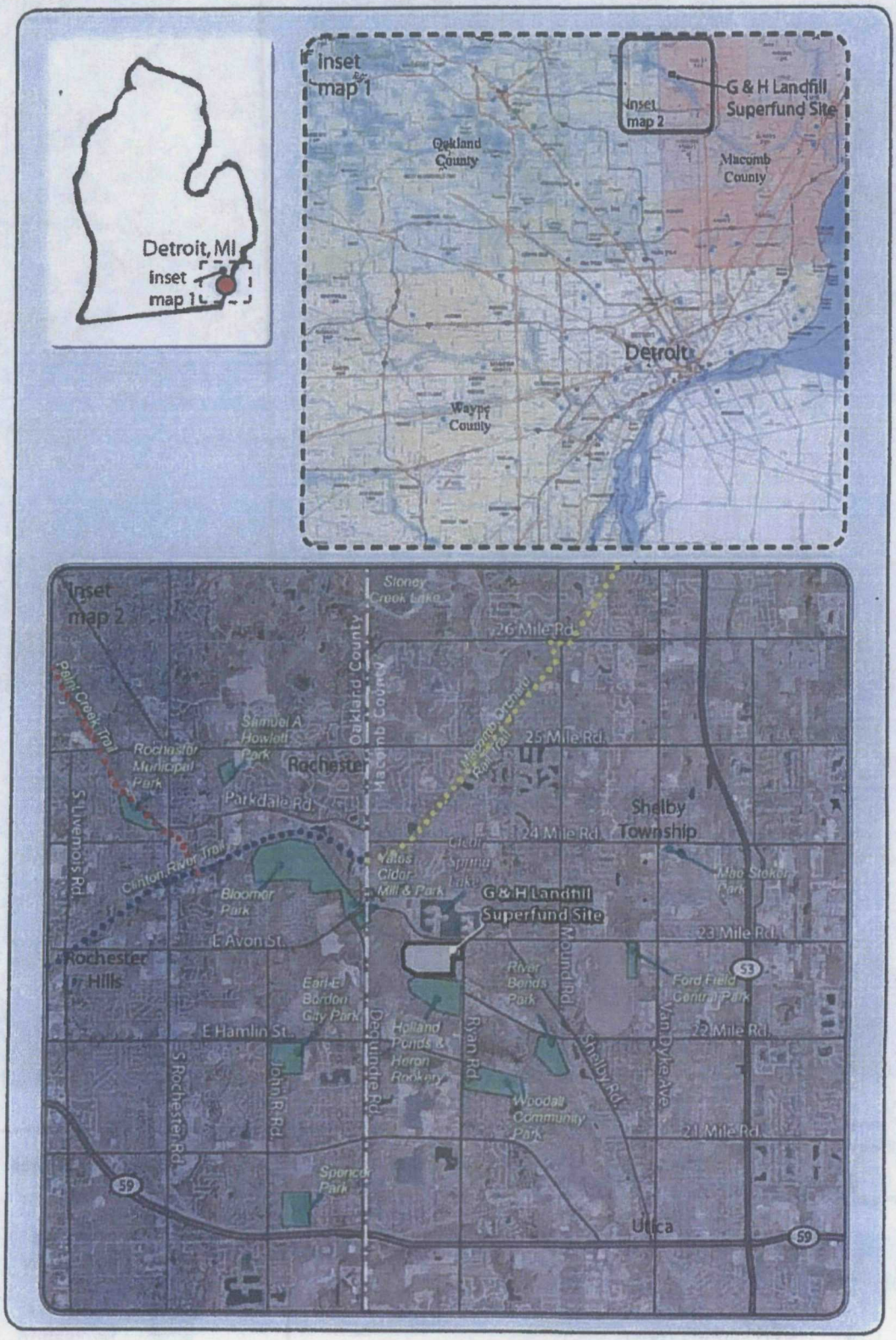
XI. Next Review

An Addendum to this five-year review will be issued within 12 months, which will make a protectiveness determination for the site remedy. The next five-year review for the G&H Landfill Site will be conducted within five years of the signature date of this five-year review.

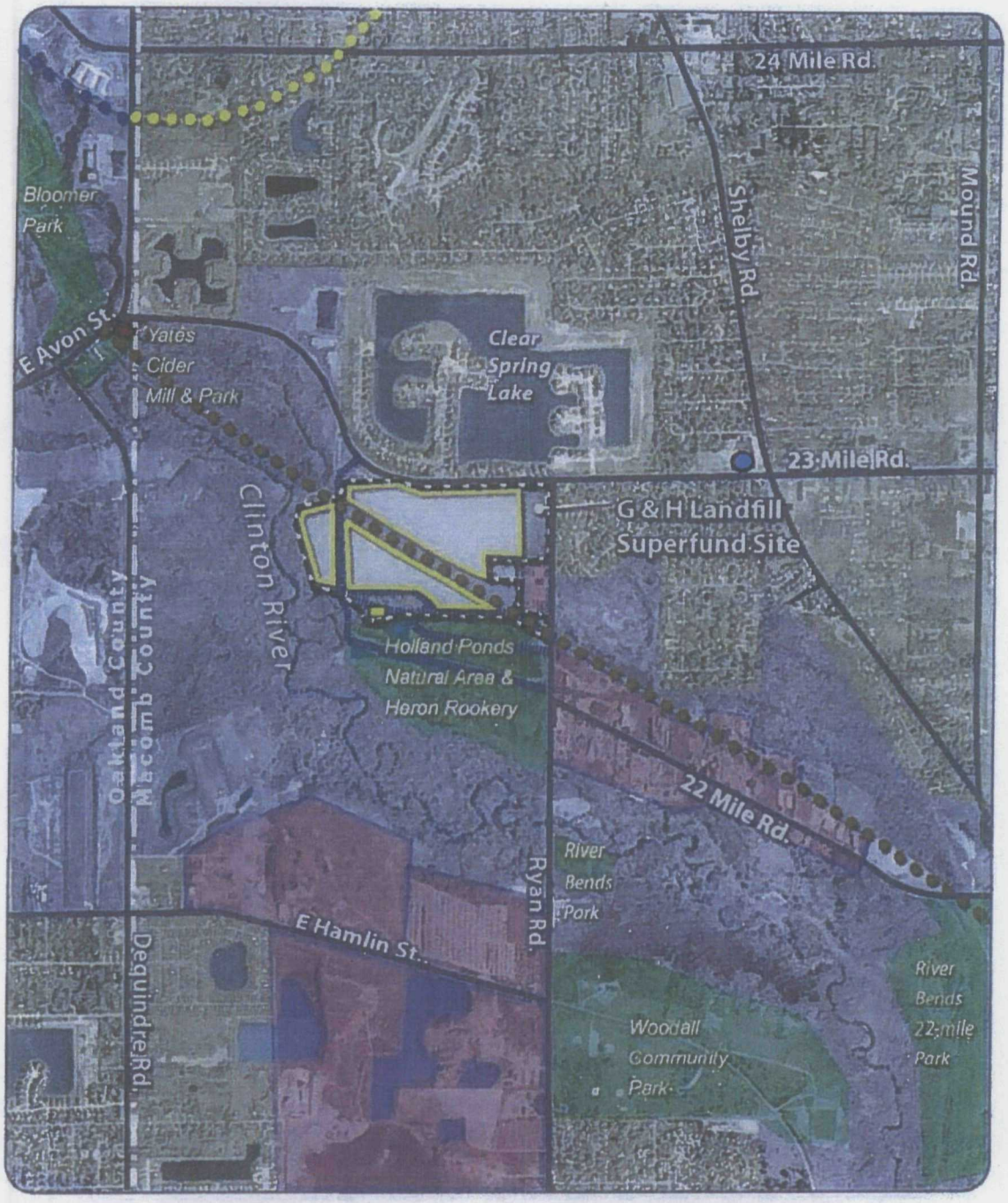
Attachments

1. Site Location Map
2. Map of G&H Landfill and Surroundings
3. Map Indicating Landfill Areas
4. MDEQ Data Analysis Charts and Tables
5. Federal Applicable or Relevant and Appropriate Requirements (ARARs)
6. State Applicable or Relevant and Appropriate Requirements (ARARs)
7. Map of Deed Restriction Boundaries
8. Deed Restrictions
9. Detailed Instructions for the Institutional Controls Investigation

Attachment 1 Site Map

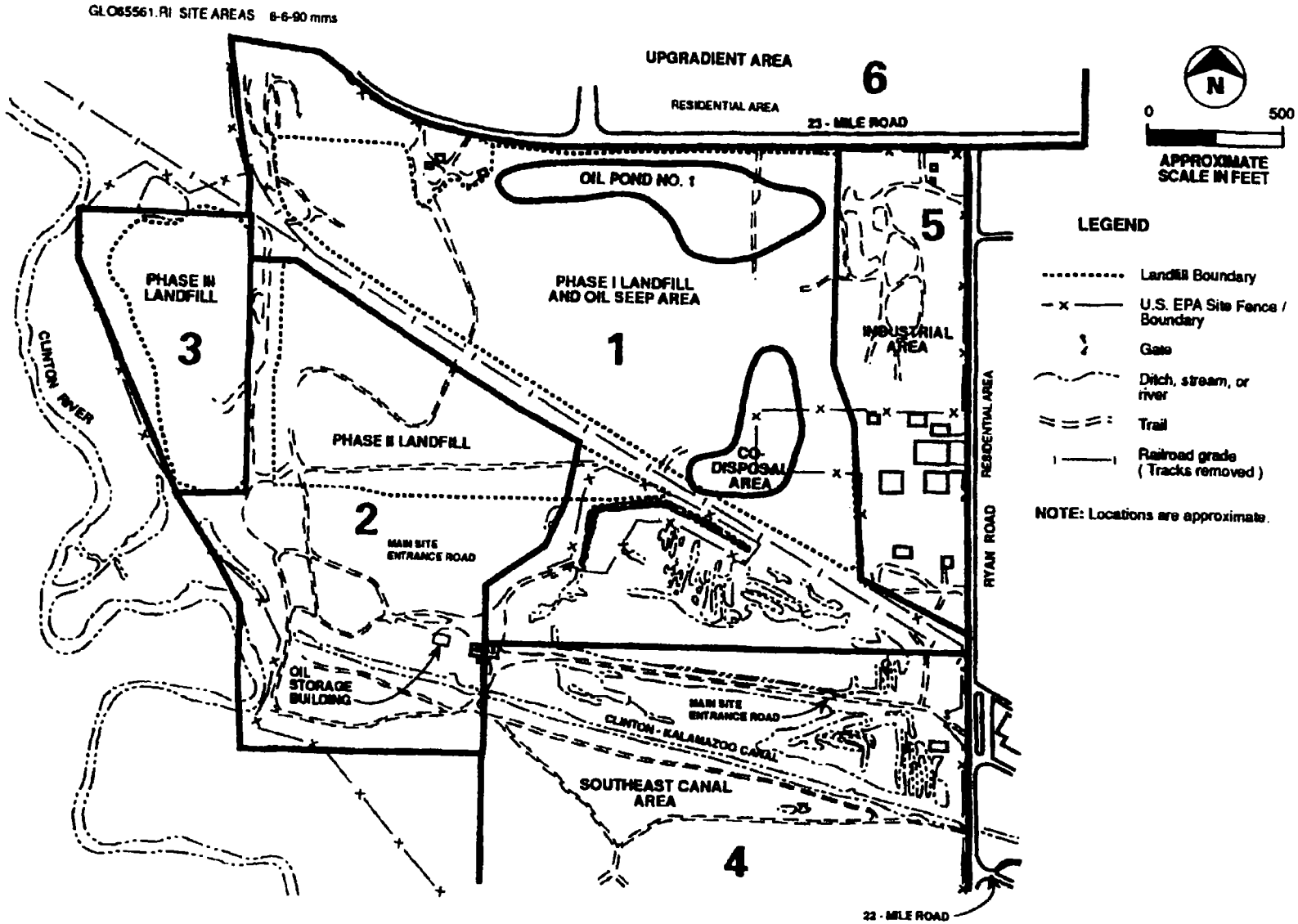


Attachment 2 Map of G & H Landfill Superfund Site and Surroundings



Key

- G&H Landfill Boundary Line
- G&H Landfill Containment Cells (phases I-III)
- G&H Landfill Water Treatment Facility
- Rail Line (not in use)
- Gravel Road
- Clinton River Trail
- Macomb Orchard Trail
- Residential Areas
- Industrial Land Uses
- Parks and Recreation
- Elementary School

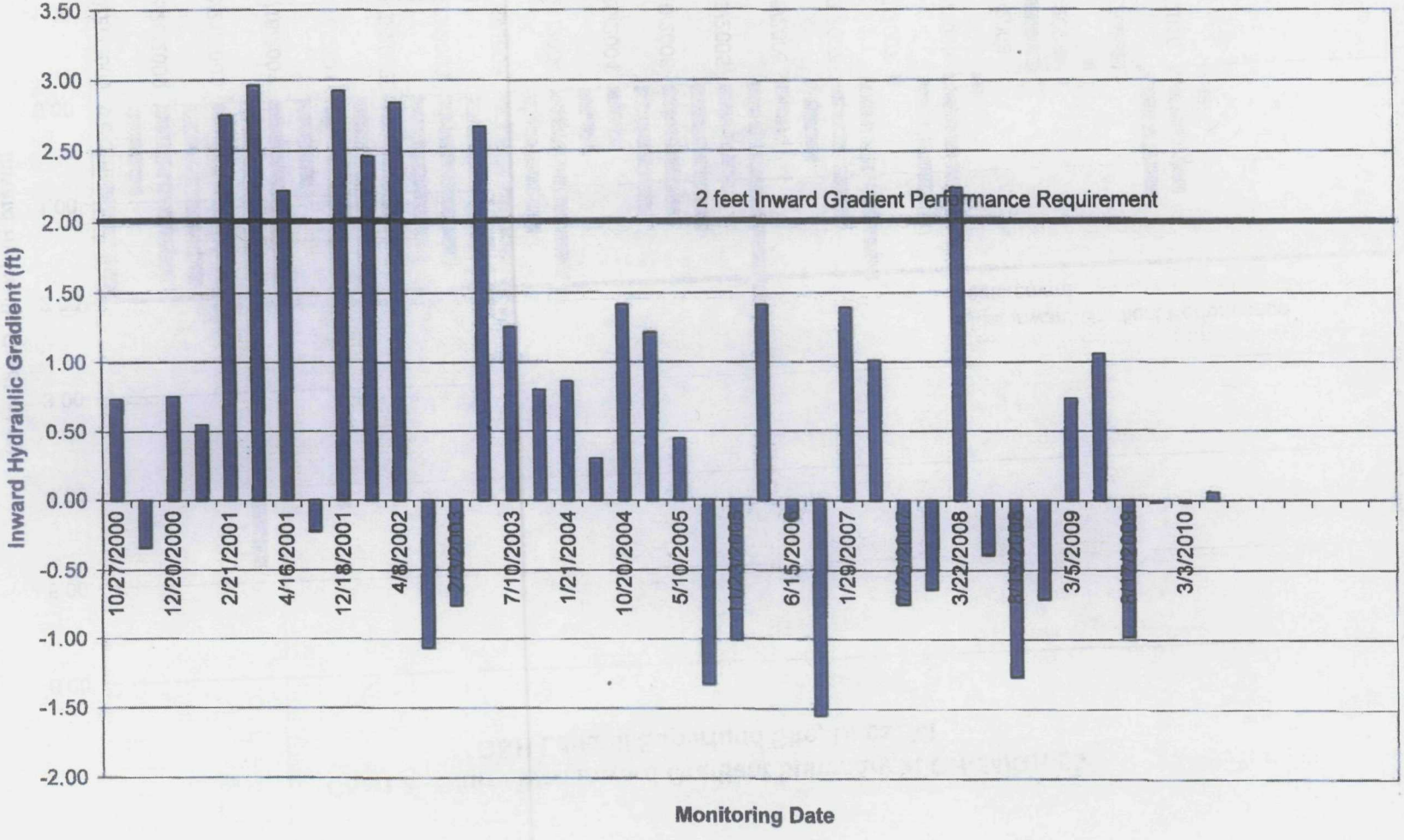


Attachment 3. Site Areas

Attachment 4

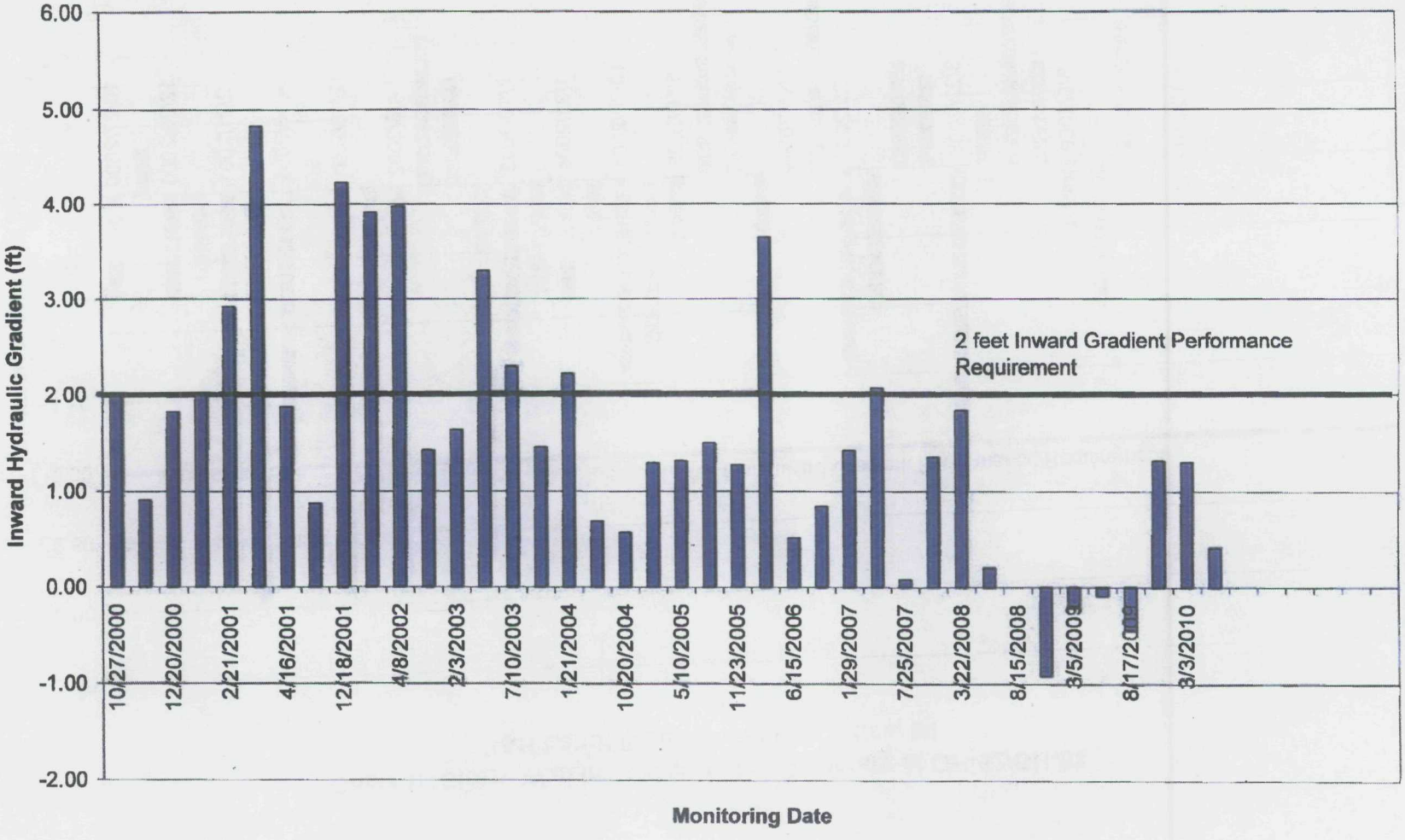
MDEQ Data Analysis Charts and Tables

Chart 1: Slurry Wall Inward Gradient Summary at GH-52/GH-53
G&H Landfill Superfund Site, Utica, MI



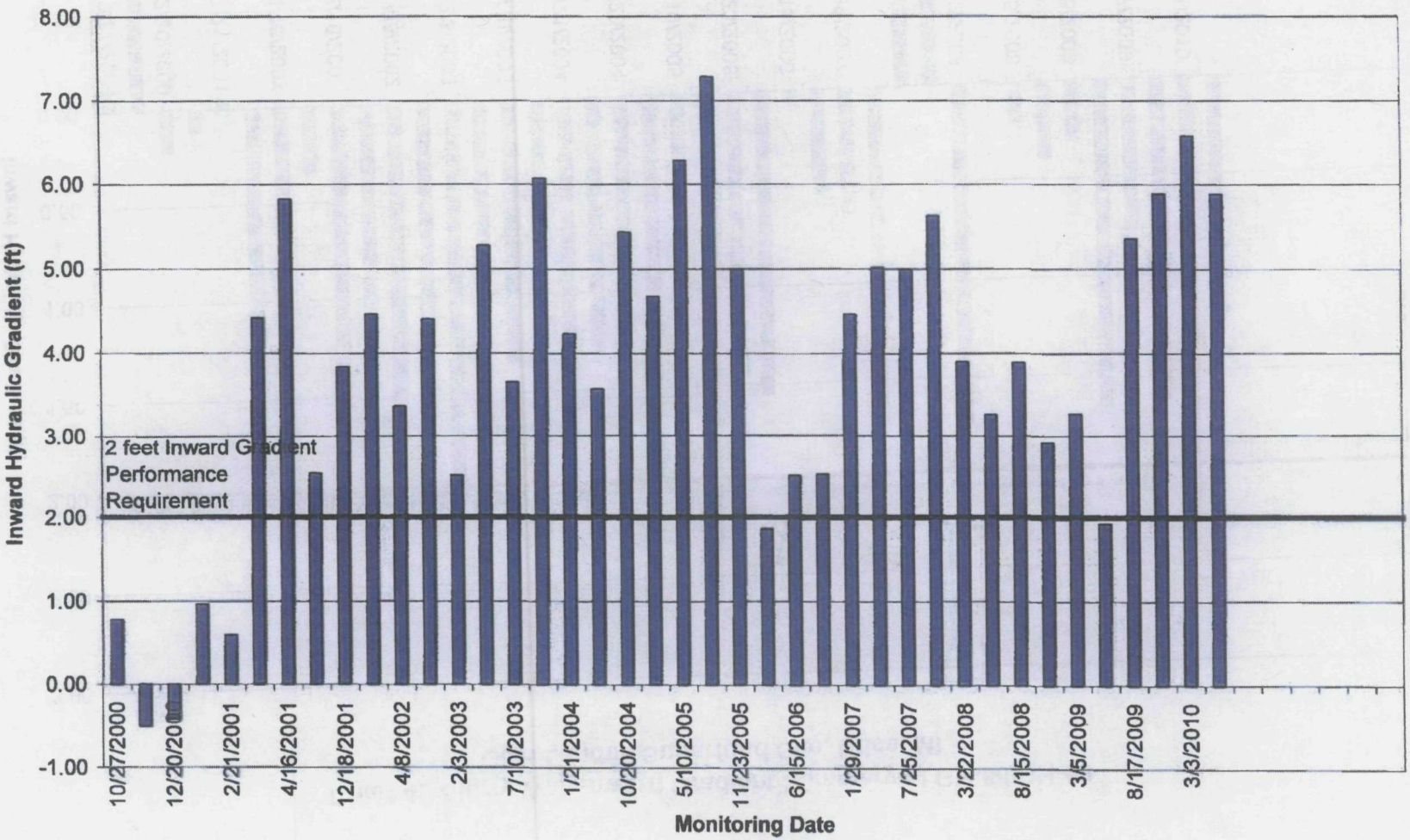
Date Printed 4/26/2011

Chart 2: Slurry Wall Inward Gradient Summary at GH-54/GH-55
G&H Landfill Superfund Site, Utica, MI



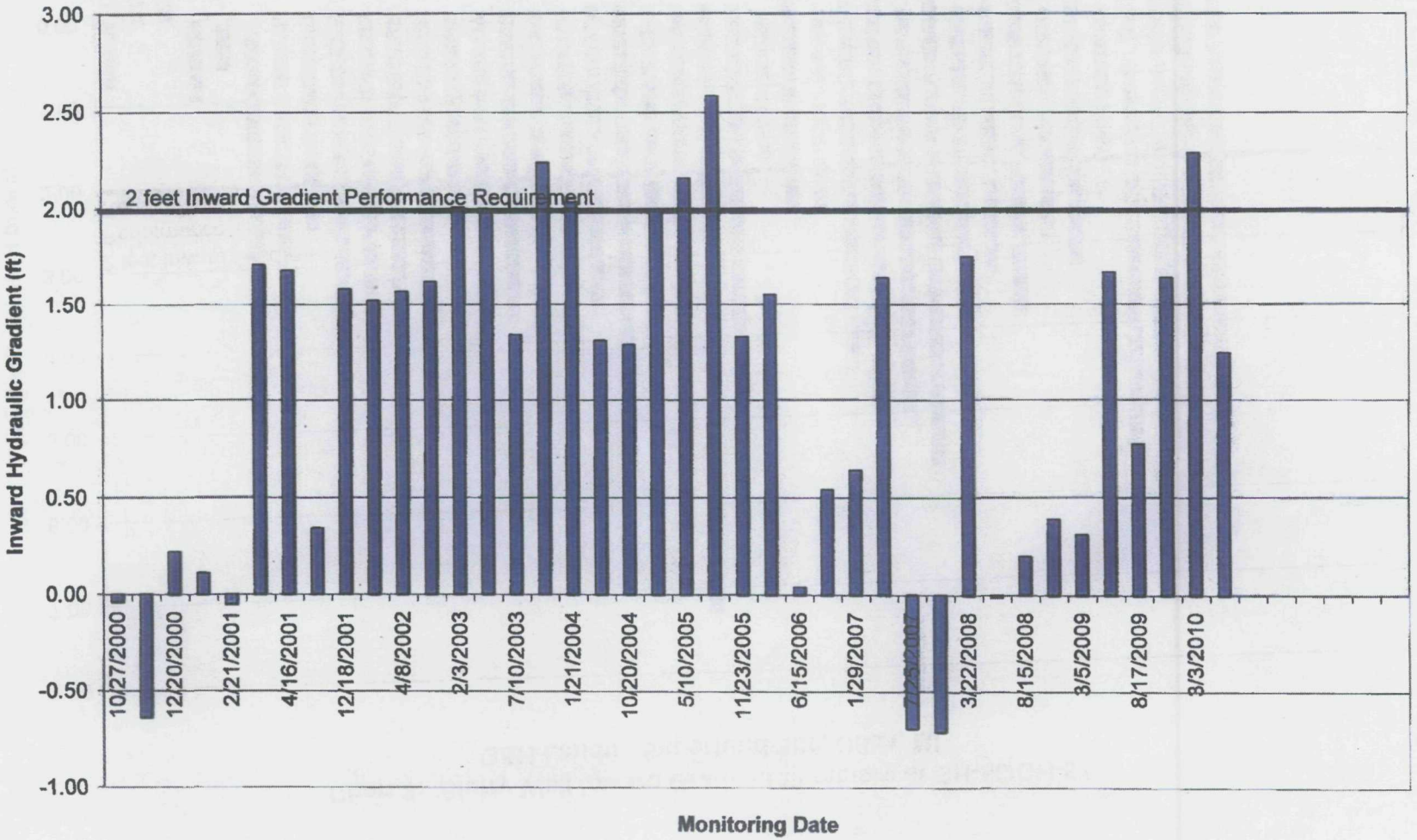
Date Printed 4/26/2011

Chart 3: Slurry Wall Inward Gradient Summary at GH-56/GH-57
G&H Landfill Superfund Site, Utica, MI



Date Printed 4/26/2011

Chart 4: Slurry Wall Inward Gradient Summary at GH-58/GH-59
G&H Landfill Superfund Site, Utica, MI



Date Printed 4/26/2011

Chart 5: Slurry Wall Inward Gradient Summary at GH-60/GH-61
G&H Landfill Superfund Site, Utica, MI

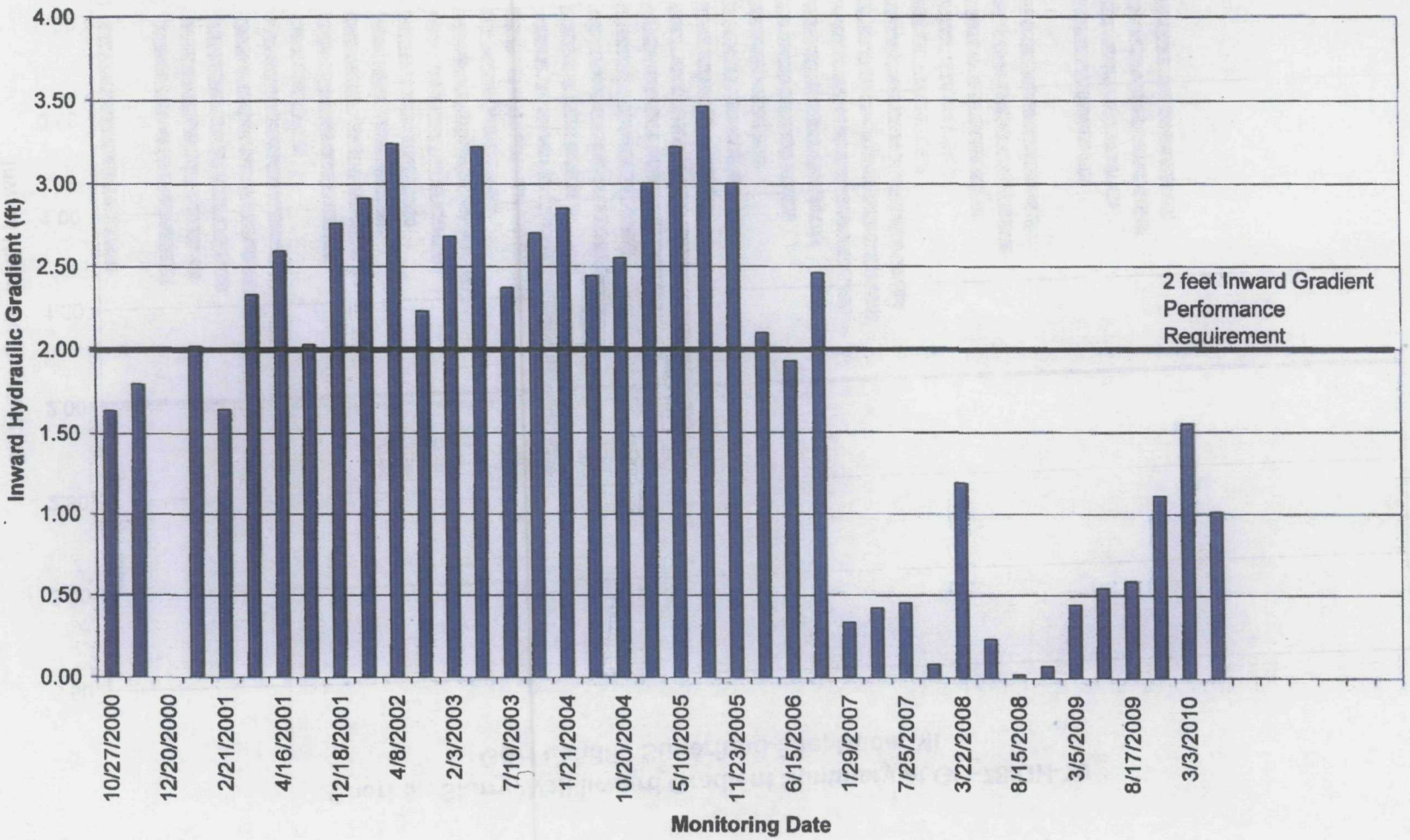


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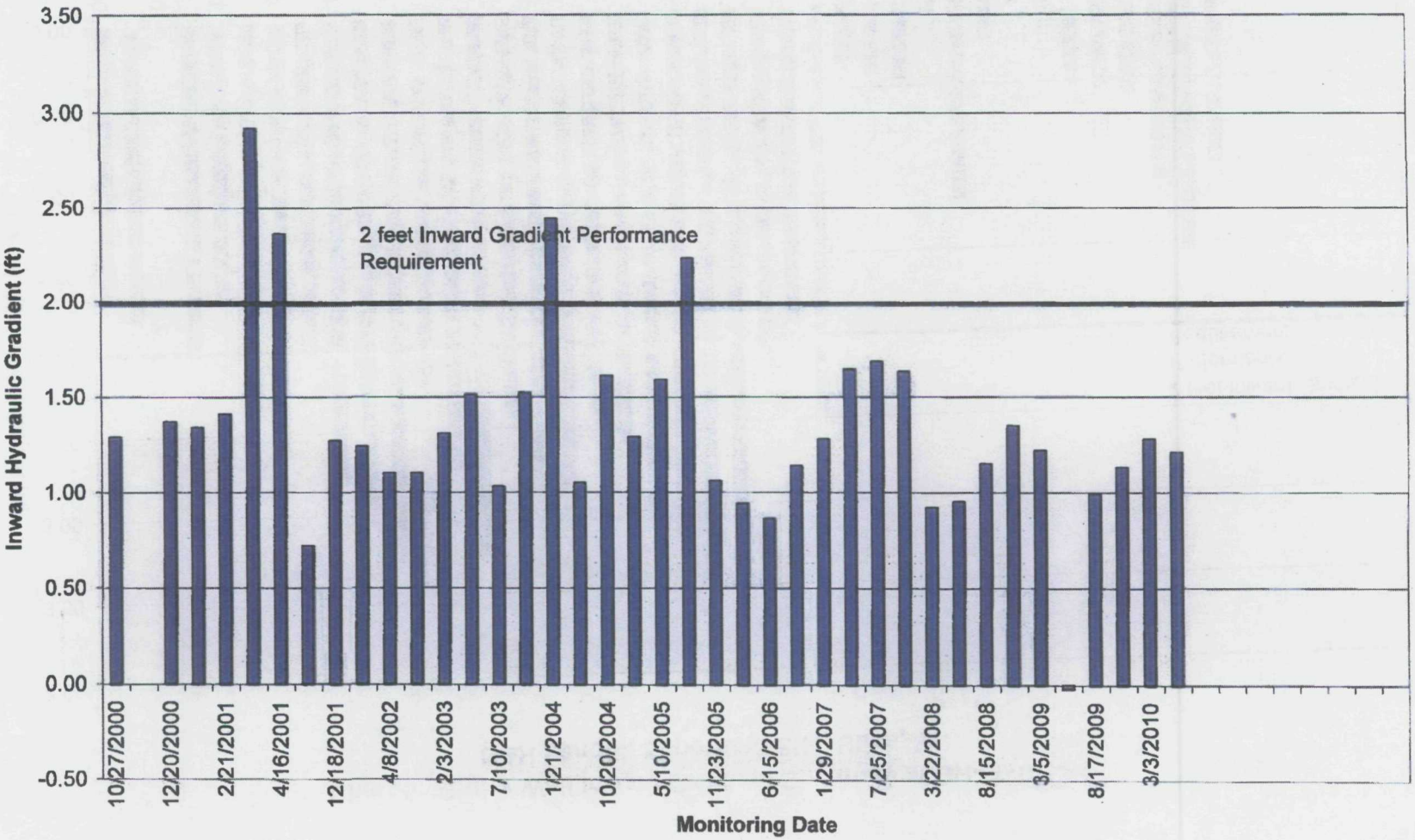
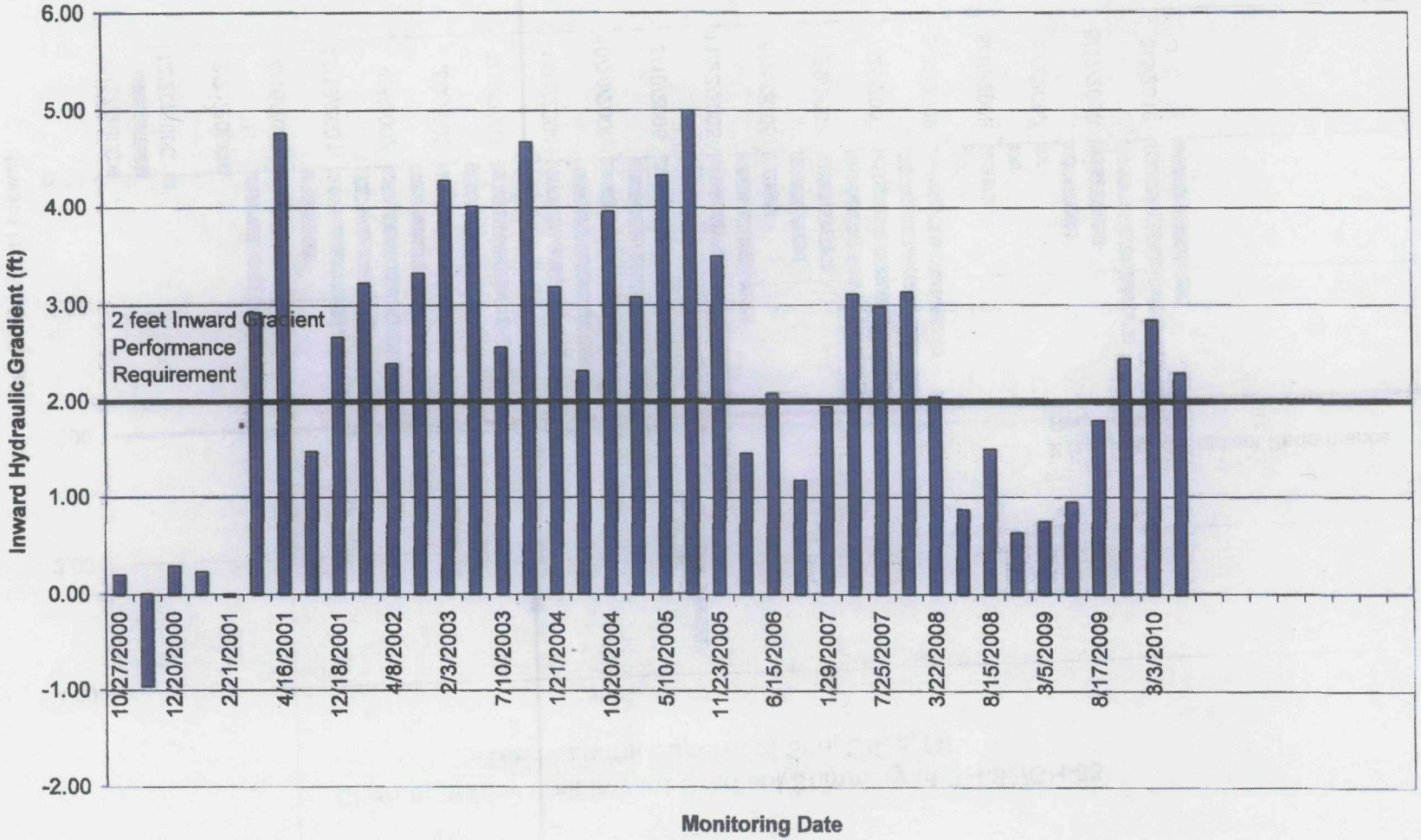
Chart 6: Slurry Wall Inward Gradient Summary at GH-78/GH-79
G&H Landfill Superfund Site, Utica, MI



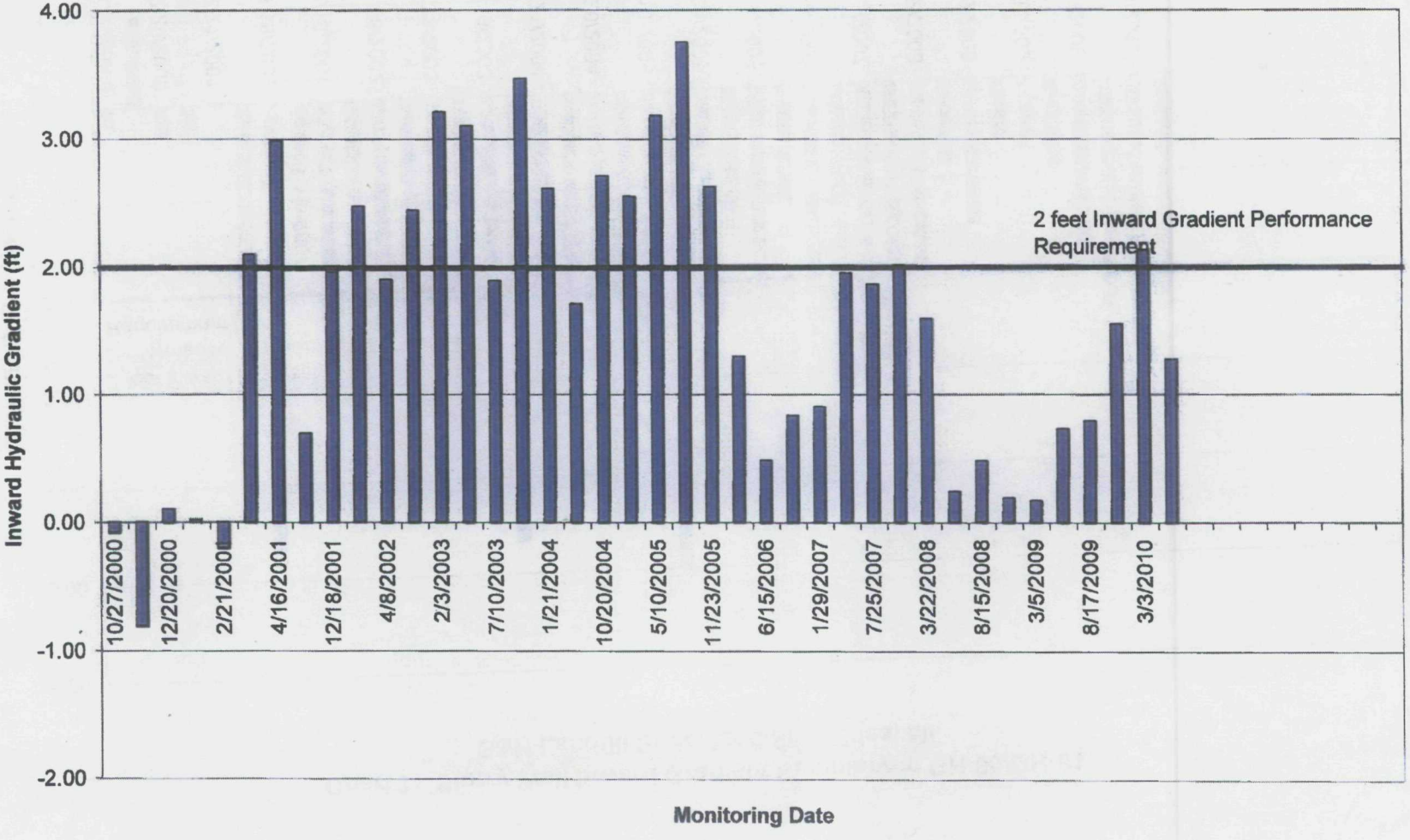
Date Printed 4/26/2011

Chart 7: Slurry Wall Inward Gradient Summary at GH-80/GH-81
G&H Landfill Superfund Site, Utica, MI



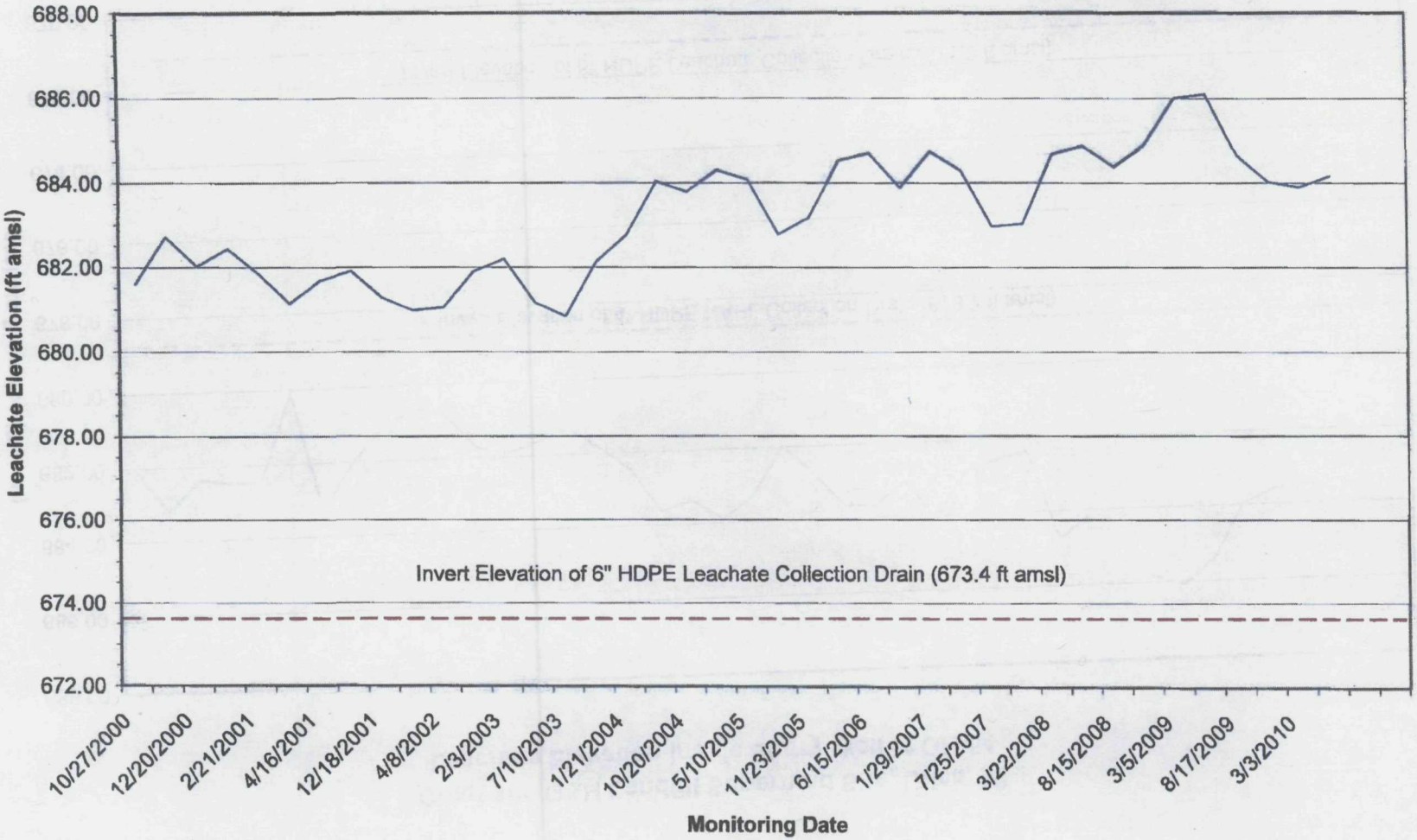
Date Printed 4/26/2011

Chart 8: Slurry Wall Inward Gradient Summary at GH-82/GH-83
G&H Landfill Superfund Site, Utica, MI



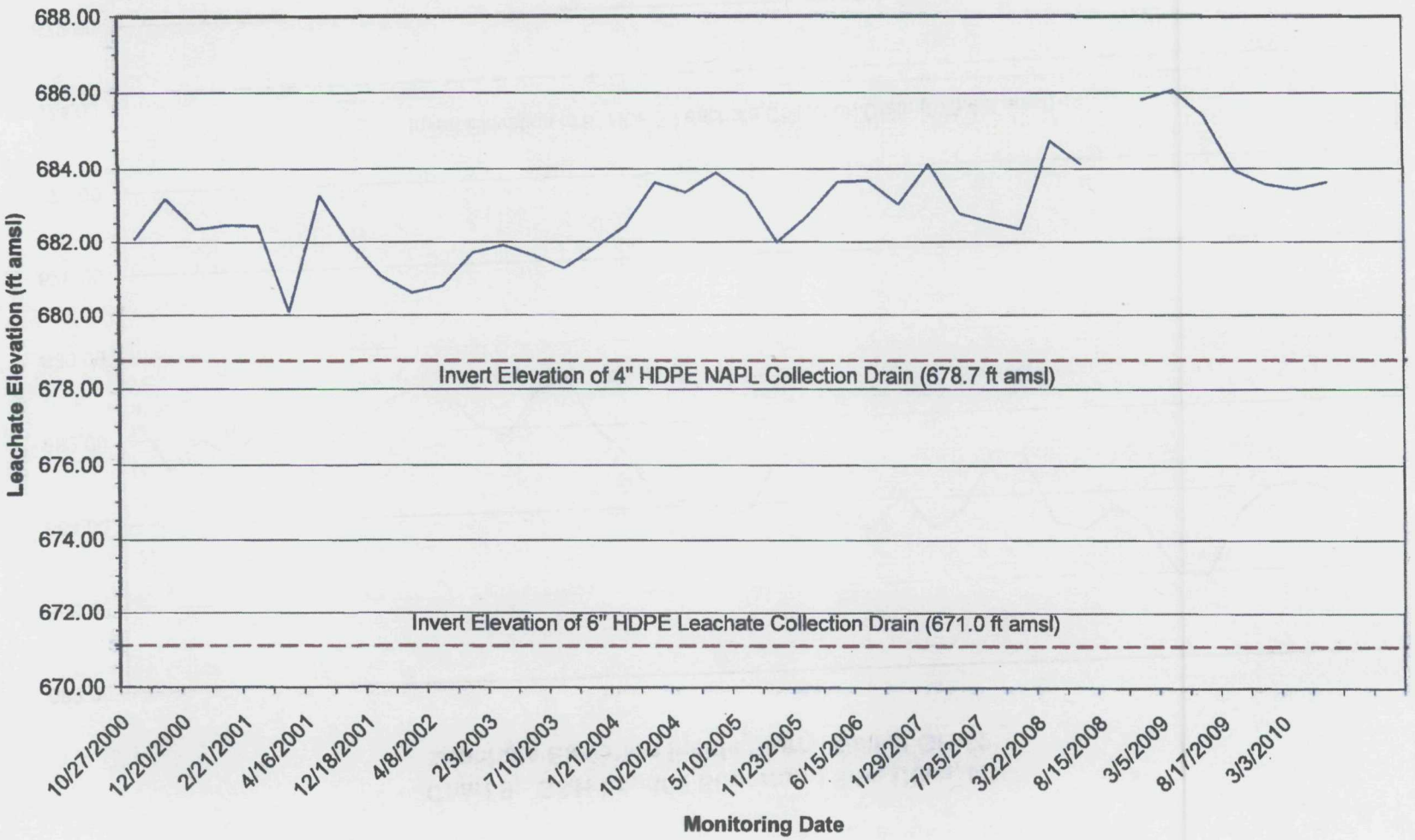
Date Printed 4/26/2011

Chart 9: G&H Landfill Superfund Site, Utica, MI
Leachate Elevation Inside Slurry Wall at GH-52



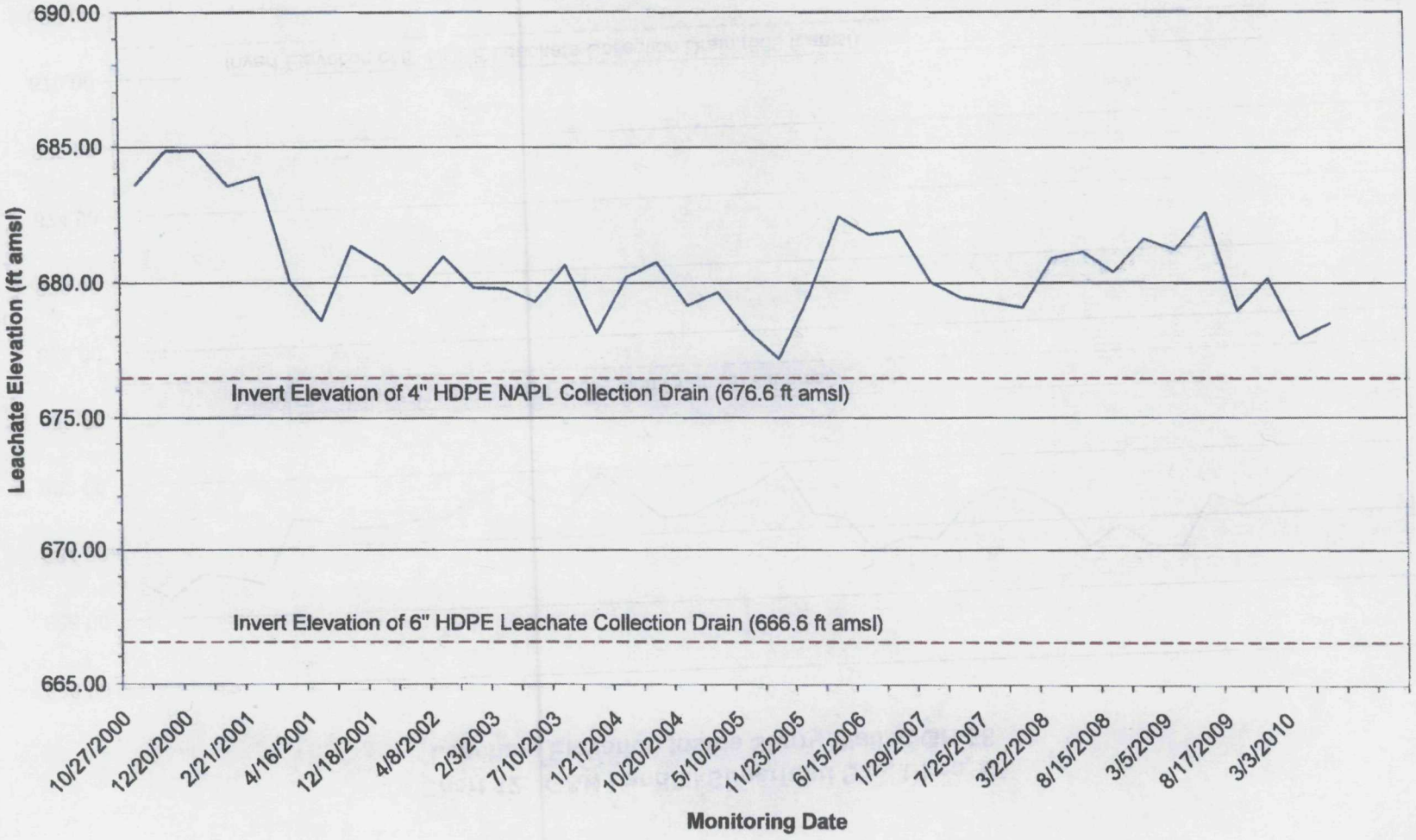
Date Printed 4/26/2011

Chart 10: G&H Landfill Superfund Site, Utica, MI
Leachate Elevation Inside Slurry Wall at GH-54



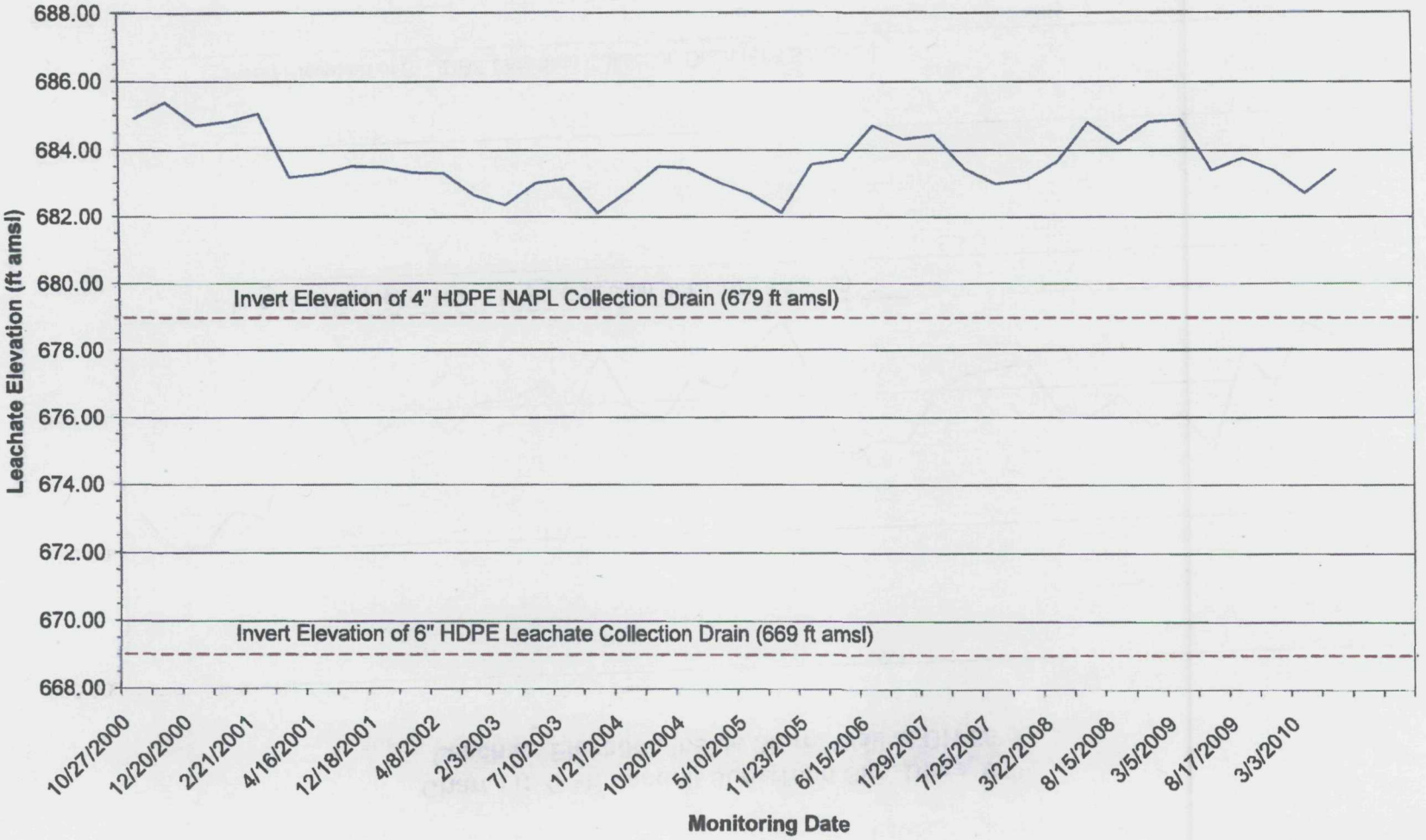
Date Printed 4/26/2011

Chart 11: G&H Landfill Superfund Site, Utica, MI
Leachate Elevation Inside Slurry Wall at GH-56



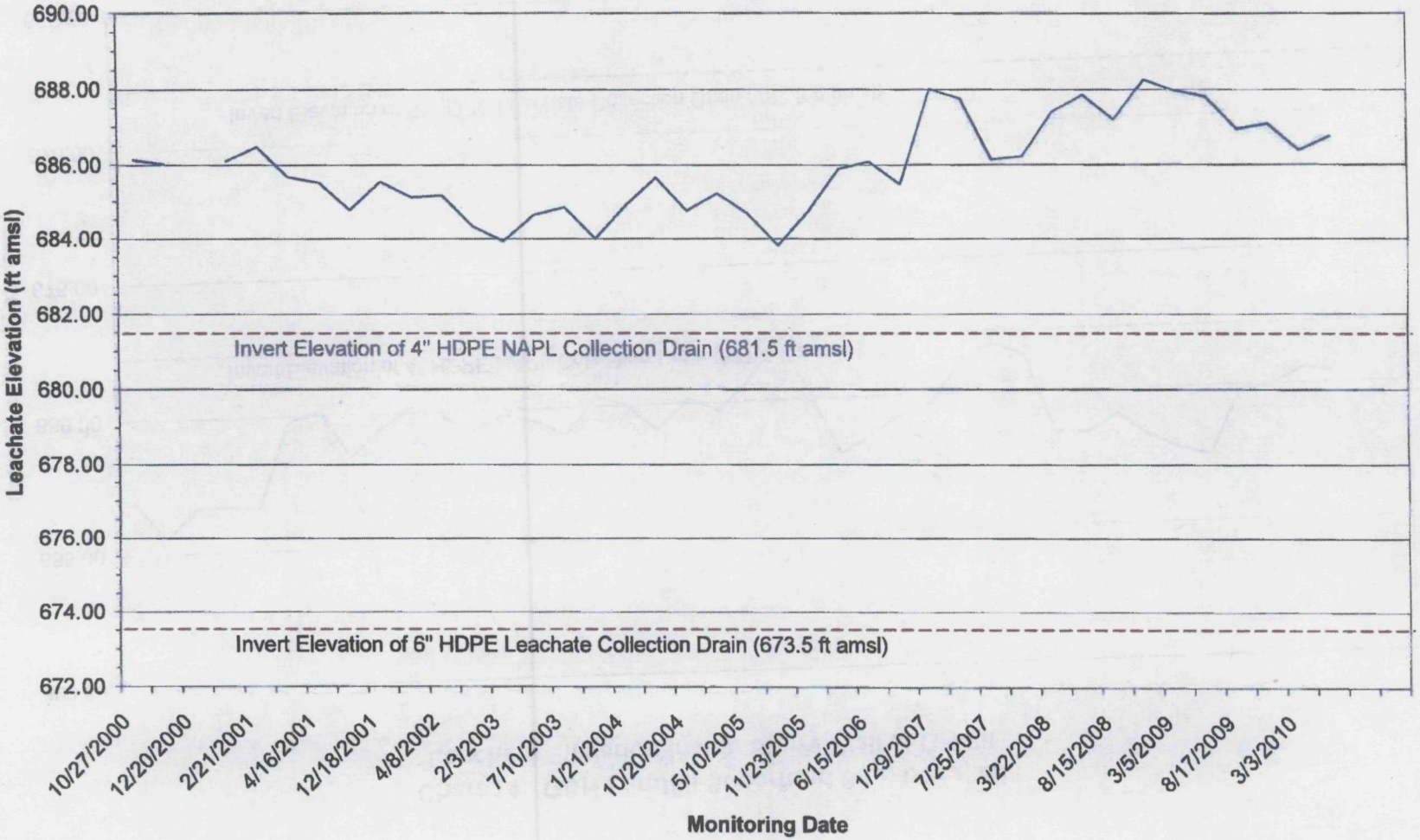
Date Printed 4/26/2011

Chart 12: G&H Landfill Superfund Site, Utica, MI
Leachate Elevation Inside Slurry Wall at GH-58



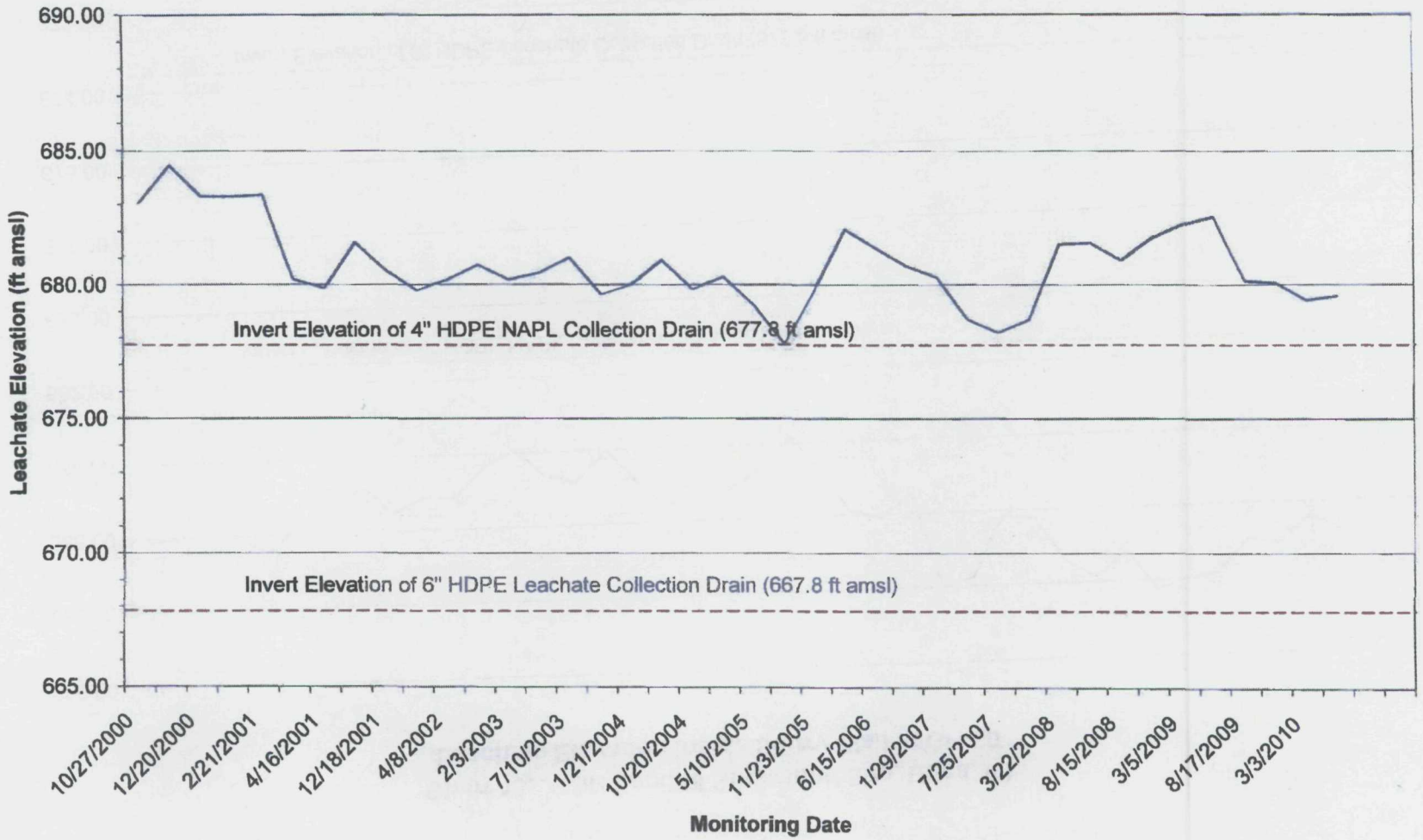
Date Printed 4/26/2011

Chart 13: G&H Landfill Superfund Site, Utica, MI
Leachate Elevation Inside Slurry Wall at GH-60



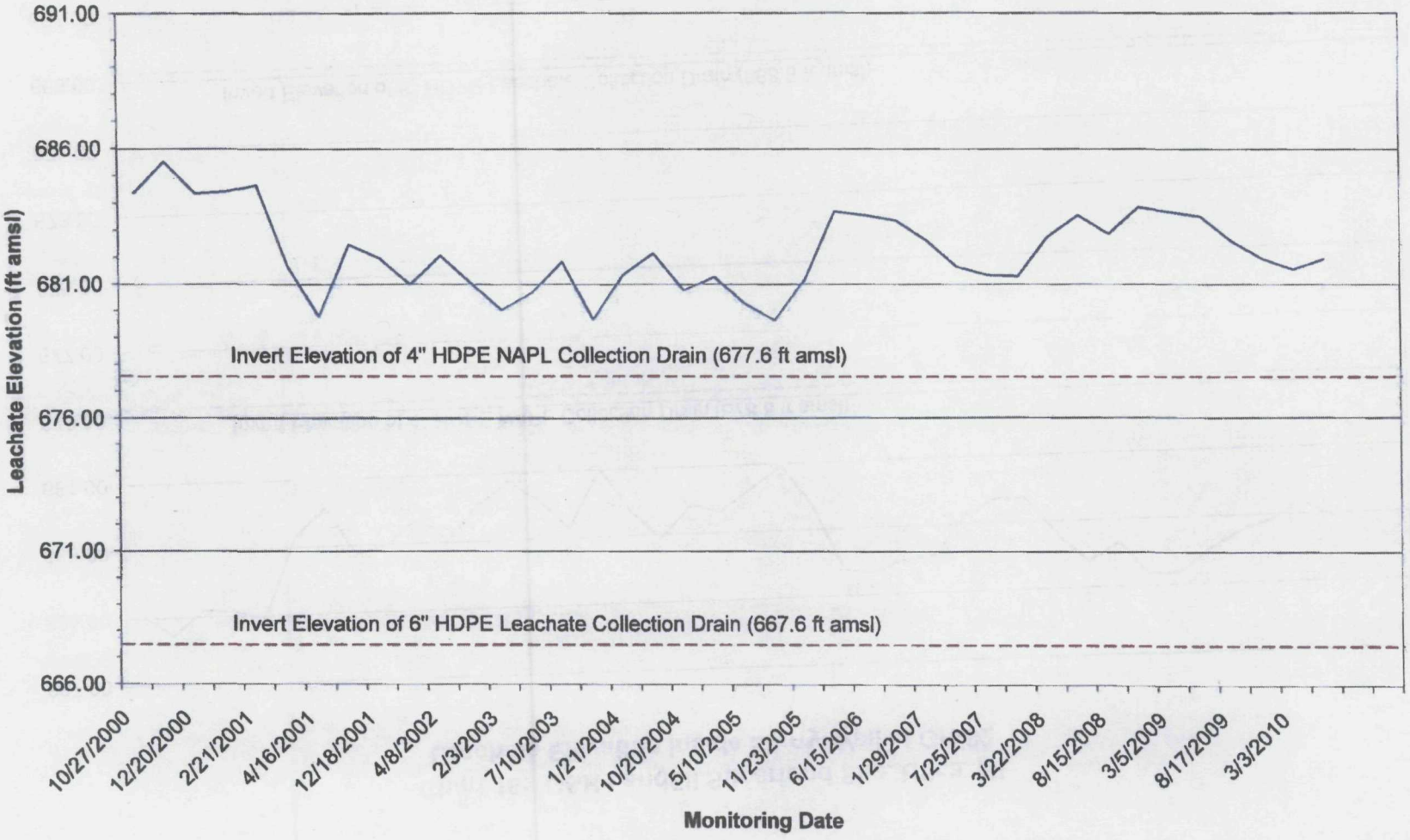
Date Printed 4/26/2011

Chart 14: G&H Landfill Superfund Site, Utica, MI
Leachate Elevation Inside Slurry Wall at GH-78



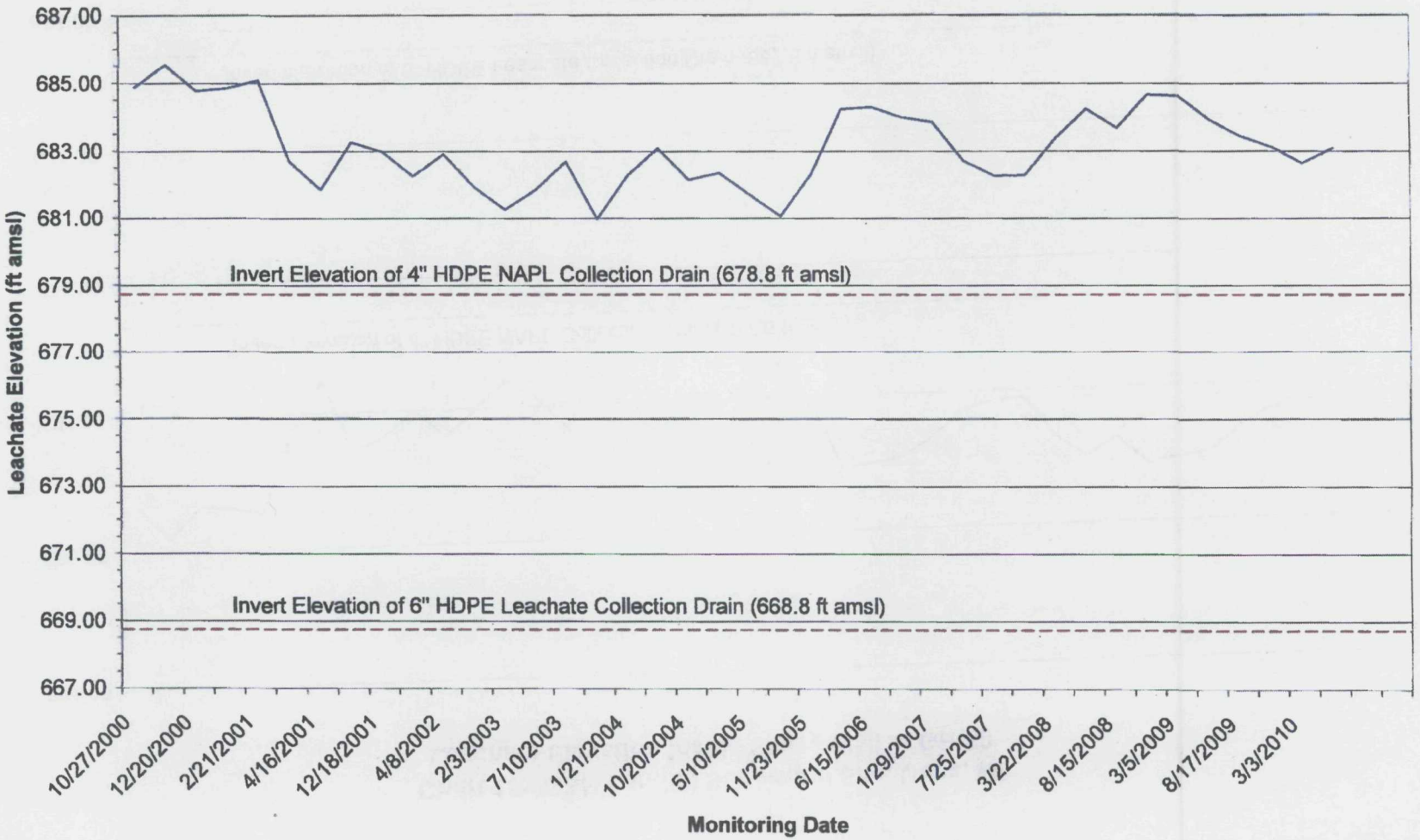
Date Printed 4/26/2011

Chart 15: G&H Landfill Superfund Site, Utica, MI
Leachate Elevation Inside Slurry Wall at GH-80



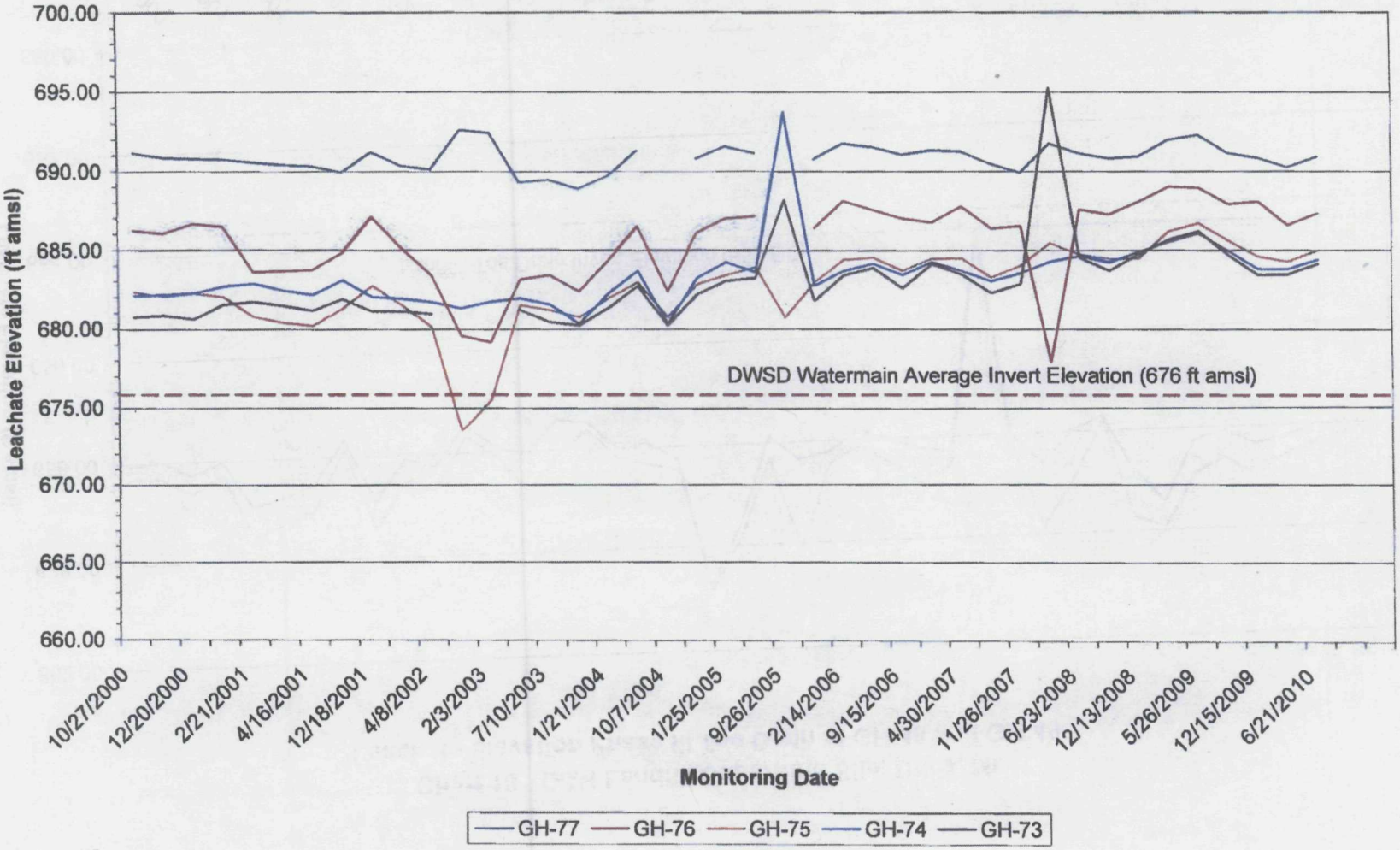
Date Printed 4/26/2011

Chart 16: G&H Landfill Superfund Site, Utica, MI
Leachate Elevation Inside Slurry Wall at GH-82



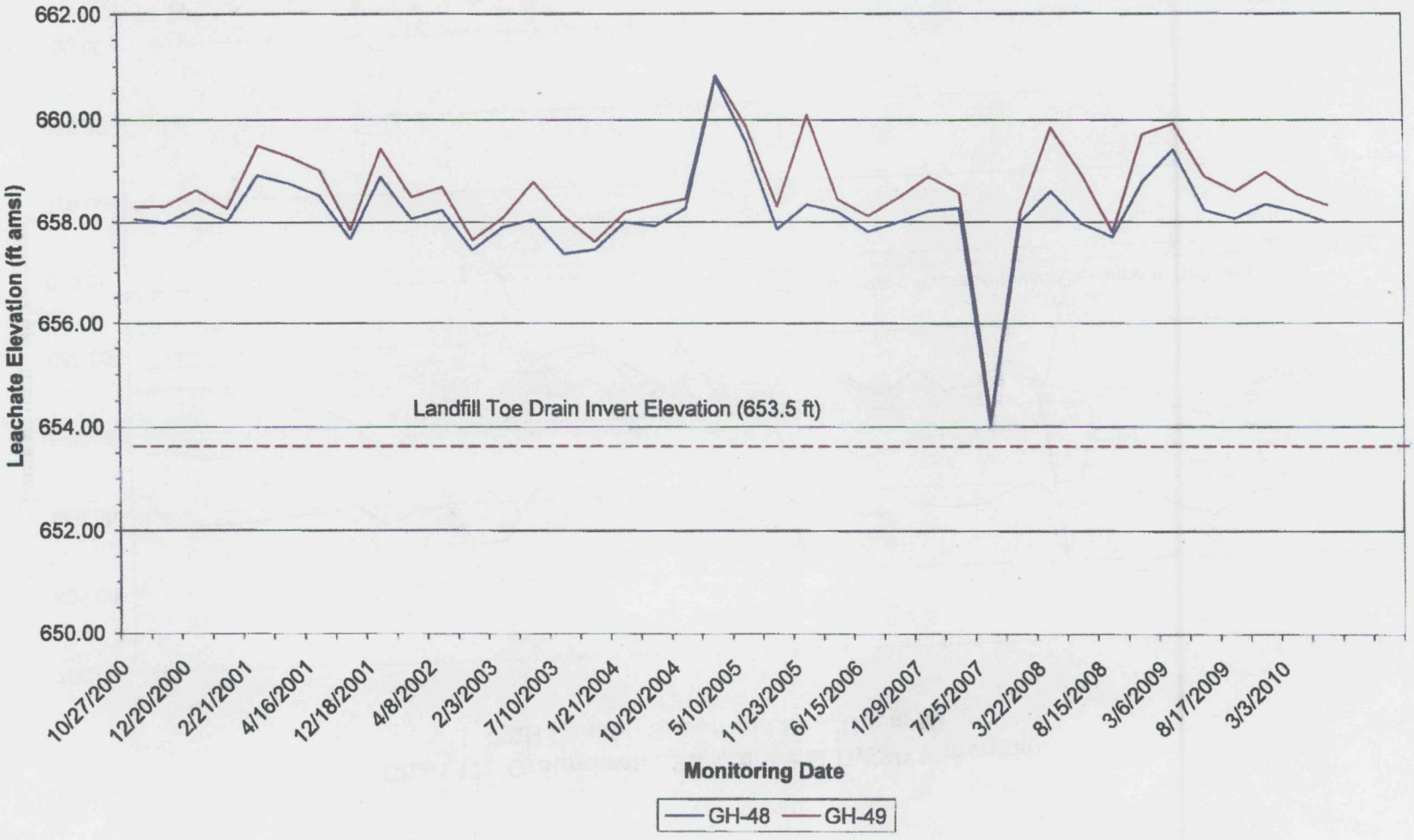
Date Printed 4/26/2011

Chart 17: Groundwater Elevations at DWSD Watermain
G&H Landfill Superfund Site, Utica, MI



Date Printed 4/26/2011

Chart 18: G&H Landfill Superfund Site, Utica, MI
Leachate Elevation Phase III Toe Drain at GH-48 and GH-49



Date Printed 4/26/2011

Chart 19: G&H Landfill Superfund Site, Utica, MI
Leachate Elevation Phase III Toe Drain at GW-10

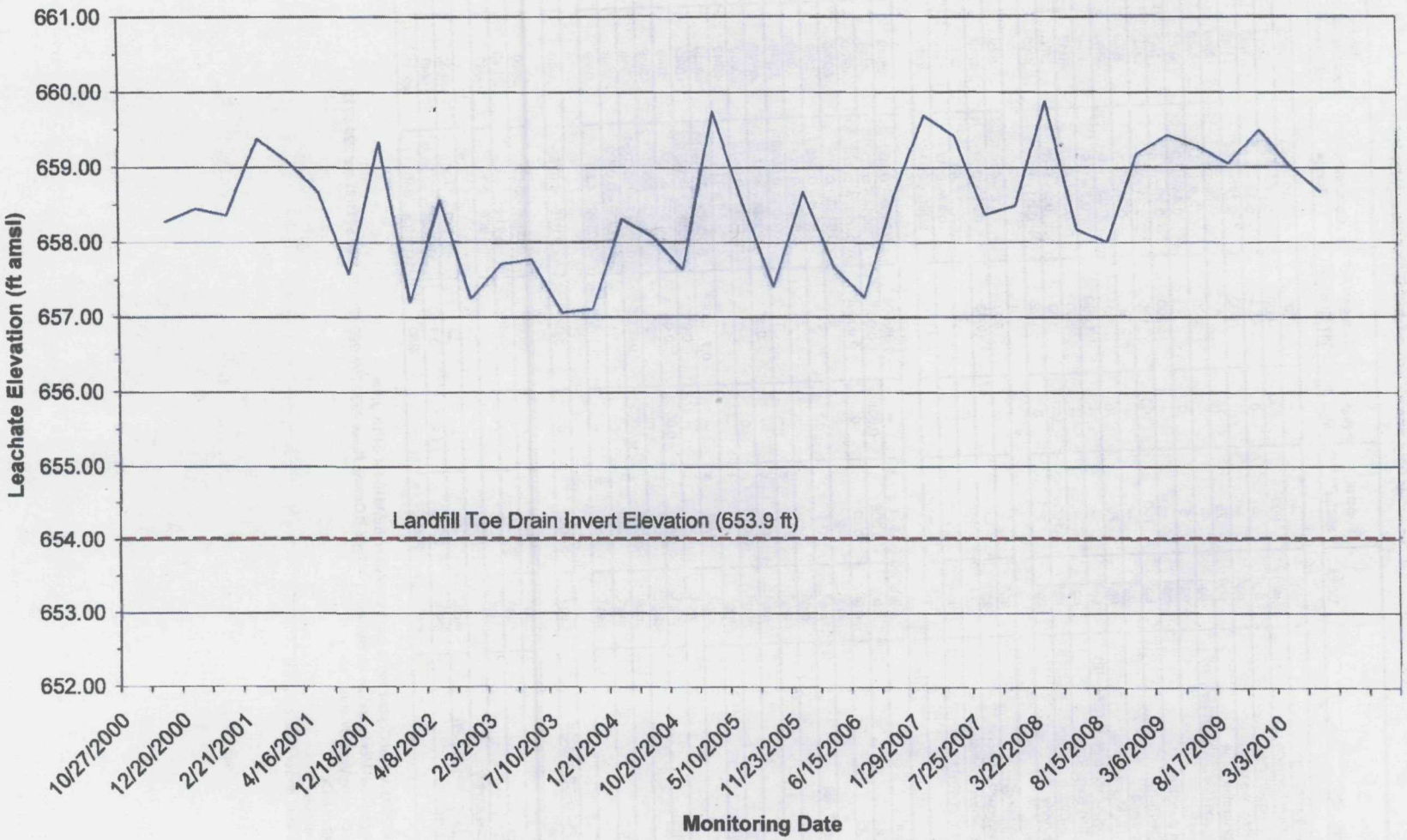


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Table 1: Summary of Groundwater Detections
June 23, 2008 Sampling Event
G&H Landfill Superfund Site, Utica, Michigan

Compound	Units	Federal MCLs[1]	Federal MCLGs	Michigan Act 307 Criteria[2]	Concentration Range	No. of Detections/ No. of Samples	Exceeds 10^{-6} Lifetime Cancer Risk	Exceeds Hazard Index of 1.0
VOCs								
1,1-Dichloroethane	ug/l	--	--	700	0.34 - 0.43	2/60	no	no
1,2-Dichlorobenzene	ug/l	600	600	600	0.27 - 0.29	1/49	no	no
1,2-Dichloroethane	ug/l	5	0	0.4	0.38 - 0.38	1/49	yes	no
1,3-Dichlorobenzene	ug/l	--	--	600	0.77 - 0.82	1/49	no	no
1,4-Dichlorobenzene	ug/l	75	75	1	0.75 - 3.6	2/49	yes	no
2-Butanone (Methyl Ethyl Ketone)	ug/l	--	--	400	0.6 - 13	5/49	no	no
Benzene	ug/l	5	0	1	0.44 - 5.3	9/60	yes	no
Carbon disulfide	ug/l	--	--	700	0.29 - 0.29	1/49	no	no
Chlorobenzene	ug/l	100	100	100	0.21 - 2.1	14/49	no	no
Chloroethane	ug/l	--	--	9	0.32 - 2.1	8/49	no	no
cis-1,2-Dichloroethene	ug/l	70	70	70	0.23 - 4.6	9/60	no	no
Dichlorodifluoromethane (CFC-12)	ug/l	--	--	1,000	0.5 - 0.5	1/49	no	no
Methyl Tert Butyl Ether	ug/l	--	--	500	0.23 - 0.23	1/49	no	no
trans-1,2-Dichloroethene	ug/l	100	100	100	0.2 - 0.39	2/60	no	no
Vinyl chloride	ug/l	2	0	0.02	0.23 - 8.6	4/60	yes	no
SVOCs								
4-Methylphenol	ug/l	--	--	400	1.2 - 610	4/49	no	yes
bis(2-Chloroethyl)ether	ug/l	--	--	0.03	0.23 - 0.52	2/49	yes	no
bis(2-Ethylhexyl)phthalate	ug/l	6	0	2	1 - 28	2/49	yes	no
N-Nitrosodiphenylamine	ug/l	--	--	--	0.47 - 0.47	1/49	no	no
Phenol	ug/l	--	--	4,000	290 - 290	1/49	no	yes
Metals								
Aluminum	mg/L	0.05 - 0.2 s	--	0.05, 0.2[3]	0.0202 - 0.458	16/49	no	no
Antimony	mg/L	0.006	0.006	0.003	0.00014 - 0.00018	4/49	no	yes
Arsenic	mg/L	0.01	0	0.00002	0.0037 - 0.136	48/60	yes	yes
Barium	mg/L	2	2	2	0.0183 - 0.508	60/60	no	no
Chromium Total	mg/L	0.1	0.1	0.1	0.0024 - 0.0453	7/49	no	no
Cobalt	mg/L	--	--	--	0.0021 - 0.0127	10/49	no	no
Copper	mg/L	1 s	--	1	0.0003 - 0.0036	32/49	no	no
Iron	mg/L	0.3 s	--	0.3[3]	0.0845 - 40.1	46/49	no	yes
Lead	mg/L	0.015	0	--	0.0055 - 0.0112	3/60	no	no
Magnesium	mg/L	--	--	--	14 - 114	49/49	no	no
Manganese	mg/L	0.05 s	--	0.7, 0.05[3]	0.00089 - 1.61	49/49	no	yes
Nickel	mg/L	--	--	0.01	0.0038 - 0.12	13/49	no	yes
Selenium	mg/L	0.05	0.05	0.04	0.007 - 0.007	1/49	no	no
Sodium	mg/L	--	--	150	9.81 - 369	49/49	no	yes
Thallium	mg/L	0.002	0.0005	0.0005	0.00017 - 0.00034	7/49	no	yes
Vanadium	mg/L	--	--	--	0.00076 - 0.0022	9/49	no	no
Zinc	mg/L	5 s	--	1, 5[3]	0.0592 - 4.52	9/49	no	yes
PCBs								
Aroclor-1254 (PCB-1254)	ug/l	0.0005	0	0.02	0.075 - 0.075	1/49	yes	yes
Pesticides								
alpha-BHC	ug/l	--	--	0.006	0.0086 - 0.02	3/49	yes	no
beta-BHC	ug/l	--	--	0.02	0.014 - 0.28	28/49	yes	no
delta-BHC	ug/l	--	--	--	0.026 - 0.19	4/49	yes	no
General Chemistry								
Alkalinity, Total (as CaCO3)	mg/L	--	--	--	140 - 1400	49/49	no	no
Cyanide (total)	mg/L	0.2	0.2	0.1	0.0052 - 0.37	9/49	no	yes
Sulfate	mg/L	250 s	--	250[3]	0.2 - 348	49/49	no	no

Notes:

[1] U.S. EPA, 2003. List of Contaminants and their MCLs. EPA816-F-02-013, June.

[2] MERA Operational Memorandum #8, Revision 1 -- Type B Criteria Rules 299.5709, 299.5711(2), 299.5711(5) and 299.5713

[3] Aesthetic Drinking Water Value

s = Secondary MCL

-- = Not Available

Exceeds federal and/or state criteria =

Attachment 5

Federal ARARs

The major ARARs that will be addressed and met by the selected remedy and whether the ARARs are listed as follows:

Executive Order 11988 and 11990; 40 CFR 6, Subpart A which requires that remedial actions must avoid adverse affects to floodplain or wetlands and evaluate potential impacts to these areas.

The Clean Air Act and 40 CFR 50 and 52 which require that select types and quantities of air emissions be in compliance with regional air pollution control programs; approved State Implementation Plans and other appropriate federal air criteria.

40 CFR 141 which requires that ground water used as drinking water meet maximum contaminant levels (MCLs) for pollutants of concern.

40 CFR 144 and 146 well plugging and abandonment and other requirements for the injection of treated ground water under the Underground Injection Control Program.

40 CFR 268 Land Disposal Restrictions for the handling, treatment, and placement of hazardous wastes.

49 CFR 107 requirements for transporting hazardous materials off-site.

40 CFR 761 TSCA regulations for the treatment, storage, and handling of PCBs.

Attachment 6

State ARARs

Act 60 of 1976 (PCB Compounds) which prohibits the disposal of waste containing a concentration equal or greater than 100 ppm of PCBs.

Act 64 of 1979 (The Hazardous Waste Management Act) which regulates the treatment, transport and disposal of hazardous wastes from site restoration.

Act 98 of 1913 (The Waterworks and Sewerage Systems Act) which are rules for construction and operation of sewerage systems, as applicable for discharge of ground water via new sewer connection and certification of the operator.

Act 127 of 1970 (The Michigan Environmental Protection Act) which prohibits any action which pollutes, impairs, or destroys the State's natural resources, due to any remedial action at the site.

Act 203 of 1979 (The Goemare-Anderson Wetland Protection Act) which regulates discharges to wetlands.

Act 245 of 1929 (The Water Resources Commission Act), as amended, which establishes surface water-quality standards to protect human health and the environment. The State administers the NPDES program under Part 21 of Michigan Act 245; therefore, Part 21 of Act 245 would be applicable to the direct discharge of treated water to the Clinton River or to a clean aquifer, to the indirect discharge through groundwater movement to a surface water body, or to discharge to a POTW.

Act 307 of 1990 (The Michigan Environmental Response Act) which provides for response activity to eliminate environmental contamination as sites containing hazardous substances and establishes cleanup standards.

Act 315 of 1969 (The Mineral Well Act) which establishes requirements for monitoring wells at the site.

Act 346 of 1972 (The Inland Taking and Streams Act), as amended, which regulates inland lakes and streams in the State.

Act 347 of 1972 (The Soil Erosion and Sedimentation control Act) which requires a soil erosion control measures at the site consistent with locally approved soil sedimentation and erosion control plans or rules.

Act 348 of 1965 (The Air Pollution Act) which requires air emissions to have 'non-injurious effects."

Act 641 of 1978 (The Solid Waste Management Act) which establishes provisions governing the

regulation and management of solid waste.

Public Health Code Act 368 which establishes the procedures for well abandonment.

Institutional Control (IC) Review

Required Institutional Controls

Superfund

U.S. Environmental Protection Agency

G&H Landfill
Macomb County, MI

MID980410823

Legend *

- PRP Site Boundary
- Estate of Leonard Forster
- Deed Restrictions (1991) - Required IC
- Auto Disposal Yard
- Watermain Easements

0 300 600 Feet

N

GEOS

* Please see Attachment 8 for Summary of Institutional Controls

EPA Disclaimer: Please be advised that areas depicted in the map have been estimated. The map does not create any rights enforceable by any party. EPA may refine or change this data and map at any time.

Created by Sarah Backhouse
U.S. EPA Region 5 on 9/22/06

Attachment 7

Attachment 8 DEED RESTRICTIONS ON G & H LANDFILL SITE

The Estate of Leonard Forster, owner in fee simple of the real estate described below, hereby imposes restrictions on the described real estate, also known as the G & H Industrial Landfill Site (hereafter "the Site") in Shelby Township, Macomb County, State of Michigan:

Beginning at Northeast corner Section 19, Town 3 North, Range 12 East, thence South 993.3 feet; thence South 89 degrees 55 minutes West 792 feet; thence South 220 feet; thence North 89 degrees 55 minutes East 396 feet; thence South 412.23 feet to R/W Michigan Central Railroad; thence Northwesterly along Railroad to South line of North 1/2 of North 1/2; thence West along 1/8 line to center line of Clinton River thence Northwesterly along River to North line of Section; thence East along Section line to point of beginning; except Michigan Central Railroad R/W. Subject to a 12 foot watermain easement, the center line description as, beginning at a point South 40 feet and West 30 feet from Northeast corner Section 19, thence West 1370 feet to the point ending, along with a 20 foot watermain easement, the center line description as beginning 1370 feet West of Northeast corner Section 19; thence South 34 feet to point of ending.

The restrictions enumerated herein also apply to the specific portion of the Site known as the Auto Disposal Yard, or Junkyard, bordered immediately to the northeast by the intersection of 23-Mile Road and Ryan in Shelby Township, Macomb County, Michigan. The legal description of the Auto Disposal Yard is:

Beginning at the N.E. Corner of Section 19, T.3N., R.12E., Shelby Township, Macomb County, Michigan; thence Due South 993.30 feet along the East line of Section 19 and the centerline of Ryan Road; thence S.89°55'00"W., 400.00 feet; thence Due North, 990.51 feet to a point on the North line of Section 19; thence N.89°31'01"E., 400.01 feet along the North line of Section 19 and the centerline of 23 Mile Road to the Point of Beginning and containing 9.11 acres.

The following restrictions are imposed upon the Site, its present and any future owners (including the hairs to the Estate) their authorized agents, assigns, employees or persons acting under their direction or control, for the purposes of protecting public health or welfare and the environment, preventing interference with the performance, and the maintenance, of any response actions selected and/or undertaken by the United States Environmental Protection Agency ("U. S. EPA"), or any party acting as agent for U.S. EPA, pursuant to Section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"). Specifically, the following deed restrictions shall apply to the Site as provided for in paragraph nine (9) of the Consent Decree:

1. There shall be no consumptive or other use of the groundwater underlying the Site that could cause exposure of humans or animals to the groundwater underlying the Site;

2. There shall be no residential, commercial, or agricultural use of the Forster property considered part of the Site, including, but not limited to, any filling, grading, excavating,

building, drilling, mining, farming, or other development, or placing of waste material at any portion of the Site, including, but not limited to, the Auto Disposal Yard as described above, for any purpose, including residential, commercial, or agricultural purposes, except as approved in writing, by U.S. EPA;

3. There shall be no use of the Site that would allow the continued presence of humans at the Site, other than the presence necessary for implementation of any response actions selected and/or undertaken by U.S. EPA pursuant to Section 104 of CERCLA, including such response actions taken by other responsible parties under a judicial or administrative order. A prohibited use of the Site includes, but is not limited to, recreational use;

4. There shall be no installation, removal, construction or use of any buildings, wells, pipes, roads, ditches or any other structures or materials at the Site except as approved, in writing, by U.S. EPA, and in consultation with the State of Michigan;

5. There shall be no tampering with, or-removal of, the containment or monitoring systems that remain on the Site as a result of implementation of any response action by U.S. EPA, or any party acting as agent for U.S. EPA, and which is selected and/or undertaken by U.S. EPA pursuant to Section 104 of CERCLA; and

6. There shall be no use of, or activity at, the Site that may interfere with, damage, or otherwise impair the effectiveness of any response action (or any component thereof) selected and/or undertaken by U.S. EPA, or any party acting as agent for U.S. EPA, pursuant to Section 104 of CERCLA, except with the written approval of U.S. EPA, in consultation with the State of Michigan, and consistent with all statutory and regulatory requirements.

The obligation to implement and maintain the above restrictions shall run with the land and shall remain in effect until such time as U.S. EPA files with the Court a written certification stating:

1. The response action required at, under or adjacent to the Site by any Consent Decree or judicial or administrative order, entered pursuant to CERCLA, has been fully implemented;

2. No other response actions are planned for the Site; and

3. The above restrictions are no longer necessary to meet the purposes of this Decree.

Attachment 9 - Detailed Instructions for the Institutional Controls Investigation

Grant P. Gilezan
Dykema
400 Renaissance Center
Detroit, MI 48243

Re: G&H Landfill Superfund Site
Institutional Controls Investigation
Shelby Township, MI
Civil Action No. 92-CV-75460

Dear Mr. Gilezan:

The United States Environmental Protection Agency (EPA) is conducting an evaluation of institutional controls (ICs) at Superfund sites in conjunction with Five-Year Reviews (FYRs). ICs are needed at sites where on-site hazardous substances remain above levels that allow for unlimited use and unrestricted exposure (UU/UE). ICs may also be necessary to prevent interference with Superfund remedy components. EPA's *Strategy to Ensure Institutional Control Implementation at Superfund Sites* can be found at http://www.epa.gov/superfund/policy/ic/strategy.htm.

Specifically, this letter requests your assistance in evaluating ICs for the G&H Landfill Superfund Site. EPA is asking that you conduct an IC investigation within six months after completion of the 2011 FYR Report, which should be signed by the Division Director on or before June 27, 2011. The institutional controls investigation needs to determine: 1) whether the deed restrictions for the site were actually put in place by a person with authority to make the conveyance, 2) whether the deed restrictions are currently valid and have not been lifted or superseded, 3) whether the terms of the deed restrictions create rights that can be enforced by EPA or MDEQ in the event that the deed restrictions are violated, and 4) whether the deed restrictions are being complied with.

The IC investigation will be used by EPA to fulfill the requirements of the 2011 Five-Year Review of the Site pursuant to Section 121 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9621(c), which mandates that EPA review remedial actions where hazardous substances, pollutants, or contaminants remain in place to ensure that human health and the environment are being protected by the remedial action. The long term protectiveness of the remedy depends on compliance with ICs. The consent decree requires that the following restrictions be imposed upon the site for the purposes of protecting public health and the environment and preventing interference with the remedy:

- No consumptive or other use of the groundwater that could cause exposure of humans or animals to the groundwater underlying the site.
- No residential, commercial, or agricultural use of the Forster property considered part of the site, including, but not limited to, any filling, grading, excavating, building, drilling,

mining, farming, or other development, or placing of waste material at any portion of the site, including, but not limited to, the Auto Disposal Yard as described above, for any purpose, including residential, commercial, or agricultural purposes, except as approved in writing, by EPA.

- No use of the site that would allow the continued presence of humans at the site, other than the presence necessary for implementation of any response actions selected and/or undertaken by EPA pursuant to Section 104 of CERCLA, including such response actions taken by other responsible parties under a judicial or administrative order. A prohibited use of the site includes, but is not limited to, recreational use.
- No installation, removal, construction or use of any buildings, wells, pipes, roads, ditches or any other structures or materials at the site except as approved, in writing, by EPA, and in consultation with the State of Michigan.
- No tampering with, or-removal of, the containment or monitoring systems that remain on the site as a result of implementation of any response action by EPA, or any party acting as agent for EPA, and which is selected and/or undertaken by EPA pursuant to Section 104 of CERCLA.

No use of, or activity at, the site that may interfere with, damage, or otherwise impair the effectiveness of any response action (or any component thereof) selected and/or undertaken by EPA, or any party acting as agent for EPA, pursuant to Section 104 of CERCLA, except with the written approval of EPA, in consultation with the State of Michigan, and consistent with all statutory and regulatory requirements. The obligation to implement and maintain the above restrictions shall run with the land and shall remain in effect until such time as EPA files with the Court a written certification stating:

- The response action required at, under or adjacent to the site by any Consent Decree or judicial or administrative order, entered pursuant to CERCLA, has been fully implemented.
- No other response actions are planned for the site.
- The above restrictions are no longer necessary to meet the purposes of the remedy.

The goal of the IC investigation is to: a) evaluate whether institutional controls currently exist that adequately implement the objectives/performance standards described above; b) identify and recommend any corrective measures to existing ICs necessary for their effectiveness; and c) recommend any new or additional ICs necessary to achieve and maintain the objectives described above.

IC Study Report requirements

Within six months after completion of the 2011 Five-Year Review (FYR) Report please submit a draft IC investigation report to EPA that includes the following components:

1. **Demonstration that existing proprietary controls have been properly recorded and are free and clear of all liens and encumbrances:** Such a demonstration should include the

following: a) a title insurance commitment using ALTA Commitment form 1982 as amended "for information only purposes" by a title company; b) copies of documents referenced in the title commitment; c) copies of the existing proprietary controls showing the recording stamp; d) copies of encumbrances, utility rights of way, leases, and subleases impacting restricted areas; e) map and GIS information that identifies parcel numbers and boundaries of current encumbrances (such as utility easements) that impact restricted areas; and f) copies of subrogation agreements for encumbrances.

2. **Demonstration that existing proprietary controls were signed by a person or entity that owned the property at the time of signature.**

3. **Demonstration that governmental controls are currently in effect:** Provide a current, dated and official copy of existing governmental controls (ordinance, statutes etc.) that implement the IC objectives for the restricted areas described above. Discuss any sunset provisions in the governmental controls.

4. **Evaluation of whether existing controls cover the entire area needing restrictions:** This evaluation should include a discussion of information used to depict the restricted areas and up to date information, data, and maps. Maps and accompanying GIS information must identify site boundaries, streets, property ownership and assessor's parcel numbers or other plat or survey information. For GIS analyses please provide an ESRI polygon-shape file projected in the UTM, NAD 83 projection system. Please identify the UTM zone and provide an attribute name in the shape file for each polygon. For example: "site boundary," "residential use prohibited," "groundwater use prohibited," and "interference with landfill cap prohibited".

5. **An assessment of objectives, restrictions and performance standards of the ICs.**

6. **An assessment of monitoring and compliance with ICs:** Discuss how, when, and by whom compliance with the institutional controls is monitored. Discuss whether the results of the IC monitoring are routinely and promptly shared with EPA and the State. Discuss whether there are measures in place to ensure that modifications to the restrictions require EPA and the State approval. Does EPA have a Memorandum of Understanding with the governmental entity? Discuss whether the property is being used in a manner consistent with the restrictions. In a summary of the results of site inspections and interviews with interested parties, please provide answers to the following questions:

- Are owners, lessees and other property holders aware of and complying with the restrictions?
- Where can interested parties obtain information about the governmental controls?
- Do the affected parties understand the restrictions described above?
- Have there been breaches of use restrictions described above?
- If there have been breaches of use restrictions, how were these addressed?

7. **A discussion of the effectiveness of ICs for both proprietary and governmental controls:** For proprietary controls discuss whether they are binding on subsequent property owners under applicable state law. For both proprietary and governmental controls, assess whether they are

effective in the short term in maintaining the objectives of protecting human health and the environment and preventing interference with Superfund remedy components. Assess whether the controls will be effective in the long term in maintaining these objectives. Discuss whether existing ICs are preventing exposure. Discuss whether land and/or resource use has changed since execution of the ROD, and please provide answers to the following questions:

- Is current or expected land use consistent with the City or County Master Plan?
- Does the property owner have any plans to sell or transfer the property?
- Are there any new developments, either constructed or planned, in the area?
- Are there any new construction permits pending?
- If so, what are the plans regarding property's ICs?
- How are current land and resource uses related to the exposure assumptions and risk calculations?
- Are any unintended consequences resulting from a particular restriction?

8. **Recommendations**: For both proprietary and governmental controls propose any corrections to existing institutional controls that are necessary to ensure that the land and groundwater use restrictions described above are implemented correctly, are maintained, and will be protective in the short term and the long term. Propose controls for remaining areas that do not support unlimited use and unrestricted exposure but are not covered by existing controls and include a title commitment for any proposed proprietary control. Propose subrogation agreements for any encumbrance that impacts restricted areas. Propose monitoring requirements and modifications to the Operation and Maintenance Plan to ensure that ICs are maintained and complied with in the short term and in the long term. The monitoring plan must include a schedule and an annual certification to EPA that ICs are in place and remain effective.

If you have any technical questions concerning this request, please contact me at 312-353-4374. If you have any legal questions concerning this request, please contact Associate Regional Counsel Jeffrey Cahn at 312-886-6670.